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**NEWS IN BRIEF**

**Honeywell boosts Level 6**

BOOSTING the top end of its Level 6 minicomputer family, Honeywell has introduced the Model 57 which is software compatible with existing Level 6 minis. At the same time the smallest Level 6 machine, the Model 36, has been replaced by the Model 33. Prices for Model 33 and Model 57 start £4,000 and £31,000 respectively.

**UK subsidiary**

THE US company that manufactures the Basic/Four multi-terminal commercial system, Management Assistance Inc. of California, has established a wholly owned UK subsidiary by purchasing the firm that has been distributing its systems here since early last year, Basic/Four (UK) Ltd.

**Wanted: Imnos**

GREATER Manchester has joined the growing list of regional authorities staking a claim for Imnos, the NEB's fledgling semiconductor company. Voiced by the North West Industrial Development Association, the claim is based on the region's existing experience in the field, with companies like ICL, IBM, NCR, Honeywell and Ferranti already established in the area.

**Gray power in UK**

ONLINE access to a Cray-1 vector processor is now available in the UK via the LUCS bureau's parent company, United Computing Systems Inc. of Kansas City. Meanwhile Cray Research has received an order for an \$8.8 million Cray-1 from AT&T subsidiary Bell Labs for installation at its Murray Hill, New Jersey plant in 12 months' time.

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# 'UK first choice for new investment'—NCR boss

From Keith Jones in Dayton, Ohio

DESPITE the cutbacks in its workforce being made by NCR at its Dundee factory due to changes in technology the company's president, Charles Exley, favours Dundee as the location for any new European manufacturing facilities that may be required by NCR in the future.

Exley told Computer Weekly: "If we needed to expand our manufacturing capability in Europe we would invest in the UK. One reason is that we consider labour relations to be good in the East of Scotland."

Exley pointed out that the Dundee plant is now manufacturing NCR machines ranging in size from the 8200 series of interactive multi-terminal business systems up to the 8500 series of medium scale mainframes. But he confirmed that Dundee will not build the 8600 series of large scale mainframes which will soon be competing with systems as powerful as the IBM 3033.

The 8600 is expected to be announced before the end of this year and Exley freely admitted that NCR had lost some big customers in the past through not being able to offer them the capability to upgrade to a large scale mainframe.

Looking at word processing, a growing market not yet exploited by NCR, Exley said that his company had no plans yet to move into the word processing business, and stated frankly: "We do not understand the requirements of the market and in any case we are too busy with other things at the moment. But word processing undoubtedly has great potential."

The majority of NCR's business comes from customers in retailing and banking, many of whom could be intimately involved with Electronics Funds Transfer Systems when and if they are implemented on a significant scale. But Exley is rather sceptical about the pros-

pects of one aspect of EFTS, automatic debiting, catching on in a big way.

"I cannot see automatic debiting appealing greatly to the consumer because his bank account would be debited directly and immediately from the terminal in the shop so he would lose the advantage of float."

"In addition, the cheques that consumers use for payment at the moment cost them nothing so why should they bother with automatic debiting?"

## Qume launches double density diskette drive

From Louise Kayhoe in California

SHORTLY after news that it is likely to be taken over by ITT (CW, September 28) Qume has entered the disc drive market with a dual sided double density diskette which is to be manufactured under licence from YE Data of Japan.

Qume claims to have overcome the media wear problem which have dogged dual sided disc technology, and expects to have its Data Trak 8, eight inch drive in volume production early next year. The company will follow up with a 5¼ inch drive in the second quarter of 1979. Qume is already sampling the Data Trak 8 to unnamed OEM customers.

Data Trak 8 stores 1.8 Mbytes of unformatted data and 1.2 Mbytes in IBM format and is compatible with existing drives. Facit, which markets Qume printers, it to discuss European marketing of the drive next week.

Elliot Wasserman, Qume vice president of marketing, said that he expects Data Trak 8 to be used in a wide variety of systems. He suggested that they would be incorporated in word processors, test equipment, medical systems, and home computers as well as general data processing systems.

"The Data Trak 8 introduction will mark the long awaited shift by word processor and small business system makers to the higher capacity drives", he noted.

According to Qume, the Data

## A double touch of luck

THERE'S more than a touch of luck about the names X-Data and Computercall, the peripherals wholesaler and service call logging and supply companies set up by Henry Lewis. The names are also carried by two nephews owned by Henry's brother Bill, a fellow director in the companies. Last week X-Data romped

home at Haydock Park at 33/1 to score her first win and on Tuesday, Computercall continued the success story with a 10/1 victory at Edinburgh. Commenting on the wins Henry Lewis said, "Value for money is nothing new for X-Data, we lead the field in pricing. And Computercall was just living up to its name."

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## US court throws out appeals by Milgo

THE US Supreme Court in Washington has refused to hear appeals by Racial-Milgo on any of its antitrust claims against Western Electric regarding its connection of modern AT&T's telephone network.

The district court, in rejecting the claims, held that Western Electric was immune to antitrust laws because the FCC's exclusive jurisdiction over its activities.

## Thomson order

TO enhance its reservations and administration system, Thomson Holidays has ordered a Jaguar word processing system from Hallmark Computers of Chiswick, London.

## Details of first System X sites

THE first two System X exchanges to be ordered by the Post Office will be for Woodbridge in Suffolk and Baynards House in the City of London. The orders will be placed with one of the System X contractors early next year and have already been approved by Post Office senior management.

Woodbridge will have a small 930 line exchange and Baynards House a junction tandem exchange to handle traffic between local exchanges.

Since mounting a display at Communications 78 in April the Post Office has let out very little information on System X, other than a rough schedule for its phased introduction between 1981 and 2010.

Plessey, GEC and STC are the Post Office's major telecom-

Looking suitably thrilled by the presence of HRH Prince Charles are these ladies being safely held in check by the fence around one of the Cosser Electronics' factories at Harlow, Essex. The four ladies are (from left) Dot Natt, "Flo" Dimaline, Mary Reed and Shashi Kumra.

Prince Charles visited Cosser last Thursday in order to pick up the information on the electronics industry in readiness for a meeting he attended the following day of the Radio, Radar and Electronic Capital Goods Industrial Strategy Sector Working Party at the National Economic Development Office.

Low media wear was achieved by electronically and mechanically controlling the head landing and take-off dynamics until the needed combination was attained — a fast approach and slow soft landing followed by a slow take-off with rapid acceleration.

## System 38 price

A LARGE configuration of IBM's new System 38 business computer is rather cheaper than the company first indicated. Having redone its sums, IBM now says that a System 38 with 30 displays, 10 printers, 1.5 Megabytes of main memory, 380 8½ inch printers would cost £280,000, and not the £330,000 it stated last week (CW, October 26). The rental would be £7,200 a month on a three-year lease.

## Medical fears

IN TRYING to calm medical fears about the use of computers in a national child health care system, Social Services Secretary David Ennals has told the British Medical Association that the department was willing to consider modifications required by doctors and confirmed that access to personal medical records would be restricted to approved research, under the control of a doctor.

## DP's TOPS

Our man about the computer world, Ben

## PROJECT GOSPEL

A BCS survey of users' views on project management, while a grammar notes tells the gospel truth.

## FORTRAN CALL

Users are urged to make a positive contribution to future Fortran developments and there is a further instalment of out-of-the-box in this week's lively list.

## ALSO

Computer users on loss of income for benefit  
Users' kit out

## APPOINTMENTS

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## COMPUTER WEEKLY'S INSIDE NEWS

Micro unions  
People and Evans  
Letters to the Editor  
Micro News  
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The Sales Bit  
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## Briefing

### Software not excluded

COMPUTER software is not excluded from the Queen's Award to Industry after all, according to the office which administers the scheme. It admits, though, that confusion may have arisen in the past from replies given to intending or unsuccessful applicants.

The Computing Services Association, which wrote to the Queen's Award Office to query the policy (CW, September 28), has been told that there is no question of software being ineligible for the award.

### Off to Greece

A THREE-MAN delegation from the UK, headed by director-general of the Computing Services Association Alan Benjamin, is visiting Greece this week at the invitation of the Greek government to discuss the contribution the UK could make to the development of the Greek computing activities.

### Savings bank challenge

A HOLD move by ICL to challenge Philipps, Datsan, Nikdorf and Olivetti in the savings bank counter terminals market has won the company an order for some 200 terminals from the Building Society.

ICL's device is based on the 7800 cluster terminal system with a specially designed 480 character CRT terminal with mag-card reader and passbook/tally roll printer from Okidata.

### Telefile new chief

FOLLOWING a "greater deficit than expected" in the last financial year, Telefile has made Hal Eden, previously vice-president of technology, the new chief executive of the company.

Telefile's first UK plug-compatible customer — Back page.

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### DP's TOPS

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# 'Cross should have left earlier'—ICL chairman



THE man who appointed Geoff Cross to head ICL, the company's chairman Tom Hudson, has said that he wished Cross had left the company a year before he did, last year.

Speaking last week at a Press briefing to celebrate ICL's tenth anniversary, Hudson also re-opened a sore that has festered within ICL ever since its inception when he declared that (he had been chairman in 1968 he would have killed the English Electric System 4 line, because of the failure of "organisational backing" for System 4. English Electric merged with ICT to form ICL.

The merger, he said, had cost ICL about £80 million in trying to create a unified organisational structure and product line.

In a pointed reference to recent criticisms from the Public Accounts Committee (CW, October 12) about ICL's slowness in repaying the £40 million loan which Hudson said had been "extracted" from the government to help develop the 2800 series, Hudson wryly commented that the £40 million could be viewed as "a 50% instalment" by the government to cover the costs it had bequeathed to ICL by what he obviously saw as a forced merger.

On Geoffrey Cross, whom Hudson had recommended as managing director in 1972, shortly after he himself had become chairman, Hudson said that for four years Cross had fulfilled the corporate need at that time and that his contribution to the company had been "essential, desirable and invaluable."

But from 1976 the man suited to lead ICL into the next decade, he said, was someone with a wider understanding of the computer industry and of marketing, such as the new managing director, Dr Chris Wilson.

Full report on Hudson and Dr Wilson speeches, page 12.

# Xerox to drop UK project

By Cameron Davis in Washington, and Rory Johnston in London

CONTINUING its growth in the automated office and communications market, Xerox is likely to establish a new packet-switching network in the US — but it has decided to abandon plans for establishing a large European research centre in Milton Keynes to study the development of advanced copiers and other projects related to office automation.

## 'Probe ICL in S Africa' call

THE Anti-Apartheid Movement, with support from the unions within ICL, has called for a full inquiry into ICL's activities in South Africa, and asked the UK government to take positive action to extend its arms embargo to include computers, similar to the US ban (see back page).

By means of its holdings in ICL the AAM has also asked the government to stall further expansion plans ICL may have.

But ICL has denied that Malawi was being used as a "back door" to bust sanctions in Rhodesia, and that two 2803s recently sold to Malawi had "disappeared", as alleged by the unions.

While agreeing that the requests for the 2803s were made to ICL in the UK via ICL (Central Africa) based in Salisbury, Rhodesia, ICL has said the agreement was given Board of Trade approval and that the machines were delivered directly to Malawi. And President Banda of Malawi has just given ICL the go-ahead to set up a new company in his country.

ICL says its only contact with ICL (Central Africa) is to receive an annual visit from the Rhodesian chairman to discuss "personal matters" only.

In addition to the union bids

The official reason given for the closure of the Milton Keynes site is that the number of staff employed is lower than originally planned. But it is known that there has been considerable rivalry between the various research laboratories in the Xerox organisation on both sides of the Atlantic, and it appears that the centres in Palo Alto and Los Angeles have won out in the struggle for some of the work Milton Keynes was doing.

The 450 staff who are already in temporary accommodation in Milton Keynes are to be moved over the next year back to Welwyn Garden City, the town they were moved from in 1975.

In the US the packet-switched network would represent a significant further step for Xerox in its moves to gain a large share of the burgeoning electronic office and information systems market.

To sharpen its focus on these markets, the company recently established a new organisation, Xerox Business Systems, to deal with all products that are not copier/duplicators — namely, word processors, facsimile and non-input printers, such as the 9700 fast laser printer for com-

Lexistron. The world processor that even attempt can use.

LEXITRON. The word processor that even a temp can use.

● Turn to page 8

## COMPUTER WEEKLY'S INSIDE NEWS

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## Why let the computer call the tune at work?

IT is hard to see what can actually be done about the loss of skills for which Alternative Technologist Mike Cooley so eloquently mourns (see page 5).

He would hardly advocate an embargo on the introduction of computer-aided design systems and other white-collar computer equipment, if only because economic growth and retention of international competitiveness are dependent on new technology.

In addition, once one is conscious of a better way to build a mousetrap, hardly anyone would choose to return to the old way. An American typist recently, under the mistaken impression that her word processor was to be replaced by a "steam" typewriter, exclaimed, "No way am I going back to washing my clothes on a rock!"

It is indeed sad that some design workers are losing the value of their skills and their prospects for what has seemed to them interesting work. However, this has always been an inevitable part of technological change, that some specialised workers are harmed while society as a whole benefits from increased production, and this continues to be the case.

The claim that creativity is being lost is doubtful. Outside the world of Artificial Intelligence few people would say that computers are actually being creative at present, whether or not they ever will be, and the jobs that have been taken over by machines so far are definitely not creative.

They may be complex but they are still basically

mechanical, and there is no benefit either to the human race or the individual worker for him to keep on doing them.

Where the machine's product is actually inferior to the human's, through enforced standardisation and the like, computerisation may be undesirable, but this is simply one of the factors that must be weighed when considering change.

Cooley's claim that people are being forced to pace their work to the speed of the machine is of more serious import. There is no technological reason for it. One of the outstanding features of computers is their infinite flexibility, which enables systems to be designed around exactly what the user needs, ready for action when required.

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This quote comes from an advertising letter I received last month promoting a Viewdata conference.

So persuasive was the brochure, I could hardly resist it. From the likes of Rex Malik and Sam Fedida, no less, I will be able to acquire knowledge of the structure of viewdata (I thought it was now called Prestel), Post Office costs and how to design dialogues with the system.

The letter was a masterpiece, exuding expertise and PO awareness. The only trouble was that it did not have a stamp, and we had to pay the earth for the privilege of receiving it.

The moral is, of course, that he who wants to communicate must first get his protocol right. This week's IS Interrupt prize goes (in a stamped envelope) to Anthony Cobb of Malsins, Utkinton, Cheshire.

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## Dol funds micros teaching programme

A PROGRAMME to help schools and colleges to understand and make use of microelectronic technology, and to develop microelectronic engineers, is being developed at the Department of Education and Science.

A two to three year programme of seminars intended to reach 50,000 senior industrialists, trades unionists, public sector bodies and educational establishments, is also planned. The moves are being made under the Department of Industry Microprocessor Application Project, MAP (CW, July 13).

MAP had an initial budget of £15 million, with £2 million allocated for education. More than £2 million has already been allocated for education, including £1 million a year for three years to the National Computer Centre to set up and co-ordinate the series of seminars, and consultants have already been authorised.

Under MAP, £13 million is allocated for support, grant up to 25% of projects using the use of micros. There have been 94 applications for projects totalling £14 million.

So far, 17 projects worth about £4 million have been approved, and awarded. Of £1.25 million under MAP, projects cover large and small companies and range from such as microprocessors controlled Hornby railways, to machine tools.

The feeling in government circles is that the UK is clearly ahead in micro technology, and that France may have been overtaken by the UK.

The first speaker, Paul O'Grady of Microfocus, did his best to reassure a rather apprehensive audience. Cobol, he said, was now a feature of much micro equipment and existing DP programming teams would soon become dedicated to the delights of the floppy disc.

Robin Woods, of the Isherwoods sales organisation, suggested that the micro bug would broaden the minds of DP management, but not, presumably, their budgets. He agreed that Cobol had opened up new opportunities for the microprocessor.

There is some doubt whether the ill-fated dinosaur was designed in a practical mode. Not so the DPM. The first questions asked concerned system reliability. This concern, they were assured, was not a major micro factor. A complete replacement system could be a negligible £3,000.

Not only do micros apparently seldom break down, but many of the suppliers now have substantial financial backing. Even so, many DPMs would agree that the mainframe manufacturers all have considerable resources

mechanical, and there is no benefit either to the human race or the individual worker for him to keep on doing them.

Where the machine's product is actually inferior to the human's, through enforced standardisation and the like, computerisation may be undesirable, but this is simply one of the factors that must be weighed when considering change.

Cooley's claim that people are being forced to pace their work to the speed of the machine is of more serious import. There is no technological reason for it. One of the outstanding features of computers is their infinite flexibility, which enables systems to be designed around exactly what the user needs, ready for action when required.

No way am I going back to washing my clothes on a rock!"

## High technology creates jobs—IBM chief

OVER the past 25 years, high-technology industries have created nearly nine times as many new jobs as low-technology industries, says IBM chairman Frank T. Cary.

Addressing the monthly American Chamber of Commerce lunch at the Hilton Hotel, London, last week, Cary underlined the contribution made by high-technology companies to the US economy by referring to "a recent study."

"In increasing output per employee, the high-technology industries outperform the low ones two to one," he said. "In producing real growth, they outperform them nearly three to one. And in holding down price increases — and thus inflation — they outperform them six to one."

"When so much depends on technology, competition and productivity, I believe that IBM is fortunate to be part of a high-technology industry which is both highly competitive and highly productive."

"Computations which cost \$1.28 in 1952 on an IBM computer cost only seven-tenths of one cent today. Adjusted for inflation that is a productivity increase of 400 times."

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The reason for the dramatic turnaround is that the company sold one Cray 1 computer during the quarter, whereas it failed to make a sale in third quarter of 1977. Adding in a tax-loss benefit, net profit for the quarter was \$3.4 million.

For the current period, Cray does not expect a comparable improvement in performance over the last quarter of 1977.

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Cary

## Inmos may set up centre in Bristol

BRISTOL is one of several locations currently being evaluated by the National Enterprise Board's new semiconductor company, Inmos, for its UK technology centre. But contrary to recent press reports, it has not yet been selected as the site.

This was made clear last week by UK director



by Chad

## Marriage à la modem?

GET ready for my weekly aaaaarrrggghh! (They seem to be coming even more frequently than that nowadays.) Two sociology lecturers at the University of Utah have developed a marriage simulation system to enable people to choose a partner "rationally and logically."

They call it Matesim, and if this conjures up images of simulated rolling pins and simulated mothers-in-law, I gather the system asks you questions about your "marital values and expectations, your general value system and prospective partner's values." It matches your answers with those of prospective partners, and tells you whether the marriage would be successful or not.

It even compares your answers with "a set of idealised values that marriage counsellors have determined lead to a successful marriage."

The questions you are asked about yourself and your ideal partner concern physical habits, characteristics, personal habits, economic orientations, sexuality, personality characteristics, television viewing habits, job mobility, child discipline, "attitude toward life," and so on.

Reading about things like this is always very depressing

for a humorist. You think up the most fantastic, absurd notions for your column and then you discover that someone is taking the same idea seriously. If I dreamt up a piece about someone simulating love, and claiming that he had "determined" what it is that makes marriage successful, you'd say I was being too ridiculous for words.

It all sounds strangely reminiscent of something, doesn't it? Yes, you're right — computer dating, which is singularly unsuccessful, according to all my observations. (We were talking about this at an installation where I used to work, when the chief programmer, who was not noted for his social flair and irresponsibility to women, chipped in with, "I tried computer dating when I was at college. Quick as a flash, the unkind R&D manager replied, "What did you get — a 360/40 on casters?"

It's nice to see that the system is very flexible, to allow for the varying requirements of the user population. For example, staff at the Mormon Brigham Young University changed the questions about sexual values to ones on spiritual values, these being "more significant" to the students there.

## Pre-paid publicity

I'M SURE you will agree that the foundation of Britain's pre-eminent position in the advanced technology race is our aggressive, imaginative, no-expense-spared marketing. Take, for example, an advertisement placed by Digico in the Financial Times. The firm offers to send you a FREE reprint of a computer magazine's appraisal of their award-winning minicomputer, so long as you send them a stamped addressed envelope. Perish the thought that they should spend 7p on a prospective customer!

## LEASED LINES

What with the excitement of setting up the new offices in St. James's and buying a 3 megabyte 370/158 from an Italian bank, J.R. has gone power crazed. Now he wants to set up a computer dial-up service so that we can have instant access to clients' needs and exchanges. I suggested a blackboard and chalk, and a kind of turn look come over his face akin to that of a religious zealot. I suppose we shall do it soon and will let you all know.

M.R.D. bought and sold some Model 5 IBM tape drives last Thursday and this is developing into a good line for us.

370/148s are a very good buy at the moment and we can offer a selection for you. The base price is 60% of IBM's new price. This means we can lease a 1 megabyte 148 to you for the astonishingly low price of £7,999 per month over four years. You can buy, lease or take a conditional sale — with or without Government capital allowances. So, if you can't wait for the new "E" series, give us a ring.

J.R. has some 3420 Model 8 tape drives and 3330 disk drives for sale. M.R.D. wants to buy 3350 disk drives. Met Well I just want to sell that 370/158 to pay the rent.

Will write again next month.

M.P.H.



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## THE IMPACT OF THE MICRO

The public debate about the impact of information technology has generated much hot air and many alarming warnings about the likelihood of the micro leading to massive unemployment, or has fed glowing hopes that it will be the dawn of an entrepreneur-led Industrial Renaissance.

When the debate moves from theory to reality, it is clear that the trade union movement is going to play a major part in shaping Britain's response.

One of the most active trade unionists in this

sphere has been Ian Benson (right) national officer for Tass, the white collar section of the Amalgamated Union of Engineering Workers. Benson is a member of the Noddy computer sector working party, and proposed a motion at the Labour Party conference last month proposing more effective government planning to cope with the introduction of new technologies. In this interview with Computer Weekly editor Malcolm Peltu, Benson discusses significant points.



## Key roles for training and public ownership

THE most significant result of the current flurry of activity relating to "the impact of the micro" is likely to be a major restructuring of some of Britain's educational and training institutions — and the bringing of more information technology industries under public ownership.

That is the view of AUEW/Tass national organiser Ian Benson, who has been prominent in much of the "micro revolution" activity. While few who have examined the problem will question the need for new initiatives in training and education, the nationalisation of information technology is a proposal which will face stiff opposition.

Benson acknowledges this in his references to the Labour government, which he hopes to see re-elected, despite some

something positive to ensure that there is a co-ordinated strategy linked to industrial requirements so that there is no long term shortfall of staff with the technical skills that will be needed," he said.

One of the most urgent actions needed, he believes, is the establishment of some new central body with power to allocate resources to education and training where needed.

If the Labour government remains in power for another year or so, Benson believes there will be some major changes in the nature of the institutions responsible for education and training. Under the Tories, however, he believes the changes will happen at a slower pace.

Political points such as these are seldom far from Benson's view, because he sees politics as being intimately bound with the

watch industry, and the non-appearance of a national newspaper.

"The connecting thread is, of course, the technology. But Benson also sees an important link between the technological debate and the central argument on the wider political scene — the question of state intervention in industrial policy."

This, he said, goes beyond just the issue of the ownership of the means of technological production and into the question of how wealth generated by new techniques can be distributed to meet the needs of a society where some traditional beliefs and concepts of employment opportunities will be challenged.

"We have suffered from a hegemony of rule by economic pundits who have believed in the formula that technical change equalled increased production which would mean increased demand," he said.

But the potential that the micro, computers and automation give to increase manufacturing productivity with significantly fewer people could "change the focus of economic activity" so that "employment was no longer necessarily seen as a good in itself."

He went on: "I believe that it is important to have public ownership of technology-based industry and for the state to channel resources to wealth-producing areas fuelled by the technology."

"The state can then distribute the wealth to nourish the human factor, through education and the social services. After all, one of the main elements of wealth creation comes from the collec-

pare people for a future in which there will be less work is likely to create job insecurity."

Like many capitalists of whom he is so critical and also the former Tass member, Employment Minister Albert Booth, Benson would lay more stress on wealth creation rather than dreaming of all-year-round Christmas.

"In the future there will be an increasing proportion of the population, including a growing number of retired people, who will not be involved in productive employment. If we are to avoid a total breakdown in living standards we must find ways of growing the economy."

The unions, however, are often criticised for being a block on finding ways of improving the efficiency of British industry, and there are many examples, such as in Fleet Street, where union resistance has slowed down or halted the introduction of new technology.

Benson replies to this criticism by suggesting that it is not by drawing an overall conclusion because the reaction of the workforce to the introduction of technology "depends a lot of particular circumstances."

In other areas, such as computer aided design, computers can enhance a job and he believes agreements on the introduction of new technology will be reached, with an increasing emphasis on "quality of life" rewards, such as lower working hours and retraining, rather than purely financial ones. He believes that people will be looking more for "career security" than just job security and that a life-long national

**Legislation to ensure that the workforce is consulted before new technology is implemented would not be of much practical benefit, according to Ian Benson. Employment minister Albert Booth said he was in favour of such legislation (CW, October 12) but Benson said that such a requirement was best enforced by collective action and should not be left to the law.**

tive intelligence of the workforce. It therefore makes both economic and social sense to raise the level of education, not only in schools but through an increase in life-long education.

"There must be an enormous transfer of wealth, co-ordinated by the state, into accelerating the development of human resources through the education and training system."

He does not, however, agree with fellow trade unionists, such as the ASTMS general secretary Clive Jenkins, who say that information technology should be seen as an opportunity for moving towards a "leisure society" where it will be expected that most people, most of the time, will no longer be employed to do paid work.

"It is all very well having an image of a kind of Southern Californian Utopia but the proponents of that goal seem to have only a vague idea of how we will get there."

"People do not want to be educated to sit on their backsides, and to start trying to pre-

## Users hit out on all sides in BCS three-year survey

By Malcolm Peltu

SUCCESSFUL use of computers in the future will depend on improvements by manufacturers and users in the stability of systems, better implementation of standards and improved training to increase the quantity, and quality of computing professionals.

That is the main conclusion of a survey of users conducted over the past three years by the BCS, involving the views of the 22 organisations representing a wide spectrum of users.

As reported (CW, April 6) the resultant report criticises the user-manufacturer interface as well as indulging in an all-round flouting of all sides of the computing world.

To an outsider, the report reads like an indictment of all things relating to computing development and does not speak well of the attempts of the BCS itself over the last 21 years to improve the professional image of computing people.

But to anyone in the computing world it contains little that is new, although it provides a service by cataloguing some of the classic computing horrors and recommending some positive actions, even though it is difficult to see why these calls for action should succeed when similar ones in the past have failed.

For example, on standards it makes the familiar calls for intensified activity by international standards bodies, with increased user participation and more vigorous government procurement action in insisting on standards.

Yet it suggests that all existing groups trying to

achieve a unified user voice, such as the National Computing Centre and user groups, have proved to be inadequate.

As Donald Moore, of management consultants Peat, Marwick and Mitchell, who chaired the committee which undertook the study, says in his foreword, "The action that is recommended in the report covers a very wide field. To be effective it will need the encouragement of governments and some altruism on the part of the computer manufacturers and professionals who occupy established positions."

The following is a summary of some of the report's conclusions:

- Cost and performance: Most of the points raised by users relate to specific difficulties which they have experienced with past and current products of the computer hardware, software and service industries, and which they would like to be remedied in future. While market forces can resolve many of the problems, it was felt that there are some product areas where it would be valuable if a mechanism could be established to examine, with users' help, what further action might be taken to ensure that their reasonable aspirations are not frustrated by monopoly, or by market dominance.

- Users' need: There is a general sense of exasperation among users over the mystique surrounding computing equipment and practices. Hardware unable to operate in an ordinary office environment, software imposing arbitrary limitations and heavy operating overheads, and program packages which perform less than users require, are examples of numerous ways in which users

believe that suppliers are failing to respond adequately and sensitively to their needs.

Users are weary of phrenetic innovation, and all the expensive and disruptive changes it has involved for them. Although they do not ask for development to cease, they do ask for action that will establish a period of stability which will be characterised by longer economic lives for their systems, and by an evolutionary continuity in design which will protect their investments.

A closely related requirement is for fewer standards, but more standardisation. This will give users a wider freedom of choice, and avoid their being locked-in to the suppliers of their installed systems.

Users are also looking for some action to relax the restrictive and unfavourable terms of contract imposed on them by suppliers.

- Systems performance: Too many users have been disappointed and dissatisfied by the performance of their computer

systems. A significant improvement might be made by taking action to ensure that, in future, users participate fully in drawing up system definitions which will specify in detail precisely what requirements are to be met, and thus determine the work of the system designers and programmers.

Participation will not be possible for all users, especially the smaller ones, and some others will not wish to take part: it would, therefore, be valuable for professional bodies, such as the BCS, to consider how best to bridge the communications gap between lay customers, the appropriate specialists and the suppliers and to make these views known.

Mini- and microcomputers: Users are concerned that the introduction of even smaller and cheaper mini- and microcomputers will spread the direct use of free-standing and desk computers to a great many first-time users who have had little training and no experience in system design, programming or

## Voice of management

REPRESENTATION for the views of user managers and action to ensure that there is some recognised way of making computing professionals accountable for the systems they implement, were two key issues raised by the BCS user survey.

In many areas, such as dealing with government bodies on standardisation, manufacturers on contracts and, increasingly, with unions, general management are said to feel at a disadvantage as existing bodies do not represent the view of management. The report calls for an organisation to be set up to express the collective management view "forcefully, cogently and objectively."

The report also concludes that the "total dependence of many large organisations on their computer systems" raises urgent questions relating to the approval and security of the system and of the accountability of those involved in developing it. It calls for an initiative by interested bodies to determine what action is needed to protect the interests of users and society at large.

operation. The result could be widespread inefficiency, errors and duplication of work already done.

- Specialist staff: Users express considerable disenchantment with many of the computer specialists they employ, and consider it necessary to increase both the quantity and quality of the systems analysts, programmers and, to a lesser extent, the operators.

The quantity could be increased by taking action to improve the pay and working conditions and career prospects of in-house specialist staff; encourage the acquisition of qualifications (MBCS, for example) by persuading employers to recognise these as necessary conditions for recruitment and promotion into the more specialist posts.

\*User Requirements in Data Processing will be published by the BCS on November 29. £15 for non-members of the BCS, £10 for members.

## 'Computers are used to silence creativity of people on shop floor'

FAR from saving us back-breaking work, computers will have the same destructive effect on creative intellectual work as machines had on skilled manual work in the first Industrial Revolution. This is the view of Mike Cooley, shop steward at Lucas Aerospace and a director of the Centre for Alternative Industrial and Technological Systems (CW, February 23).

Cooley, a mechanical engineer who is also past president of AUEW (Tass), was speaking on "Computers: an Aid or an Impediment to Creativity" in the BCS lecture series, Computers and Society.

In addition to decrying the destruction of creativity, Cooley put forward the view that "computers are the Trojan Horse by which Taylorism is going to be introduced into intellectual work." By Taylorism he means "Scientific Management," whose inventor, Frederick Taylor (d. 1915), theorised that each worker should be told exactly what to do, and improvement he tries to make being disastrous to the overall scheme.

As an example of this, Cooley described computerised design systems in which humans are forced to keep pace with the rate at which the machine processes the human's creativity is eroded and he is "reduced to head-scratching status."

"We are being conditioned to accept a role subordinate to the machine," he said.

Cooley quoted an American management scientist talking about ways in which human behaviour in production systems can be controlled, placing human material on the same footing as physical raw materials. "There are many disadvantages in the use of human operating units," this scientist said, "and any system using them must incorporate appropriate safeguards."

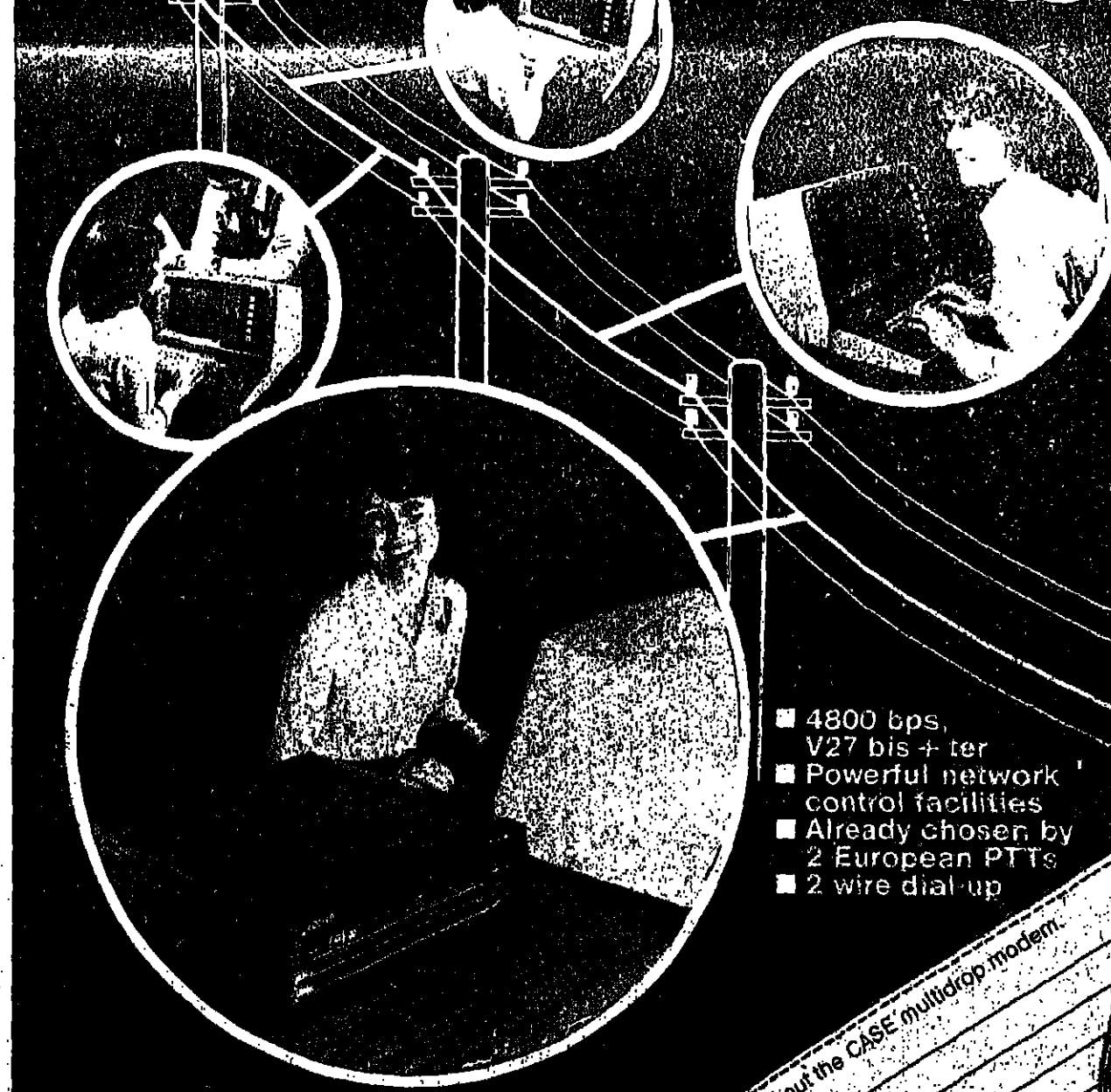
Cooley expressed horror at this notion that human beings exist for the benefit of the machine — rather, he said, the machine should be designed for the benefit of the people. It is the computer that is becoming the centre of design activity, rather than the draughtsman, as in former times.

He described how the work of a draughtsman, skilled and creative, in transforming a mechanical designer's ideas into the exact form of parts, was being taken over largely by mechanical draughting aids. He claimed that even architects are being "de-skilled" by the use of graphical computer systems.

"Computers are being used to silence the common sense and creativity of people on the shop floor," Cooley asserted.

He also claimed that over the centuries science and technology have acquired "built-in male values," such as "drive, energy and efficiency," and he would like to see more women in the field, to bring in so-called feminine values such as "sub-

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April 1981



## GILB'S MYTHODOLOGY

Let's take automation one step further



I STILL see it in books and articles: "Of course, well-structured and detailed operator instructions must be produced as part of the documentation package."

This is a traditional hangover from the days when computer hardware was expensive compared with today, and the rate of processing work was slower.

My belief and practice is that all operator instructions can and should be integrated into the program. The system itself should be capable of giving all necessary operator instructions in the appropriate situation.

It should also be programmed to undertake a maximum of the checks and analysis which the operator is asked to do today. It should also double check that the operator has actually correctly carried out any actions the machine has requested.

To illustrate how far I would and do go, I'll mention the system where after the database backup tape is produced, the system requests that the file protection ring is removed.

The tape is remounted at machine request and the machine attempts to write on it. If it succeeds, then we know the operator has not removed the ring. Better to learn that now than in a recovery situation.

My operator procedures might well function within the framework of some operating

system, but they are somewhat independent.

They are portable with my system, even when the operating system rug is pulled from under our feet. The controls are far deeper than the surface checks most operating systems perform, and the rejection of file mountings and program executions are more absolute and cannot easily be overridden by operators who are convinced they have the right file on anyway.

Frankly, any system which is designed to rely on a human operator or a generalised operating system is suicidal.

The principle of putting all operator instructions into the program extends to microcomputers. Given reasonable secondary memory such as floppy disc and the fact that most microcomputers become totally inactive if people don't know what to do, or have done it incorrectly, the case for building in all manner of help and instruction into the micro-computer is great.

It is only slowed down by our laziness in actually designing and writing the programs, which should not really cost that much more than equally good written documentation and which could replace it.

I am at a loss to think of any modern system where it would be a preferred design choice to write down an operator instruction rather than to build it into the programmed system.

Let us push the concept of automation one step further.

Presumably there are exceptions, but I would much enjoy the Devil's Advocate position if any reader would care to state the case. Notice that we are not eliminating the operator from the loop, nor are we demeaning his competence.

We are simply automating the production of the relevant instructions at the right instant. We are making it unnecessary for the operator to read through a lot of material which is not relevant to the task at hand.

And we are putting the final responsibility for checking things where it belongs — with the system designer, the programmer and the machine.

In some designs I make use of the question-mark facility. This is even implemented in the hardware of some systems such as the HELP button on an IBM System 34, though little IBM software seems to be available to back it up yet.

Any class of terminal operator should be able to ask for help at any stage with the "P". He or she should get more detailed feedback than a simple hint, if the "P" is repeated.

In more advanced self-adapting systems, the use of the "P" should be logged in order to find system trouble spots. In some systems the user supervisors should be able to insert appropriate instructions on an as needed basis.

Let us push the concept of automation one step further.

## PROGRAMMER NOTES

This week's Programmer Notes was discovered, like the Dead Sea Scrolls, by an intrepid explorer rummaging through some dusty areas (or what we in the business call a heap of paper in the bottom drawer).

The author of this piece was identified on the dusty scrolls in our possession, but would like to hear from anyone who can throw a light on its origins, indeed, significance.

## The Gospel according to the Project Manager

IN the beginning the Project Manager created the Programming Staff. The Programming Staff was without form and structure. And the Project Manager said: "Let there be Organisation," and there was Organisation. And the Project Manager saw that Organisation was good; and the Project Manager separated the workers from the supervisors, and he called the supervisors "Management" and he called the workers "Exempt".

AND the Project Manager said: "Let there be a mission in the midst of the Organisation and let it separate the workers, one from another. And the Project Manager created the mission and he called it "The System". And the Project Manager separated those who were to benefit from The System from those who were to build it. And he called the former "Users" and he called the latter "Programmers".

AND the Project Manager said: "Let all the Programmers in the Organisation be gathered together into one place and let a Chief Programmer be brought up to lead them. And it was so. And the Project Manager saw that he was competent.

AND the Project Manager said unto the Chief Programmer: "Create for me a schedule, so that I may look upon the schedule and know the Due Date". And the Chief Programmer went among his staff and consulted with them. And the staff was divided into two parts, one part was called "Analysts" and the other part was called "Application Programmers". And the Analysts went back to their desks and estimated, as was their custom. It came to pass that each Analyst brought his estimate to the Chief Programmer, whereupon he collected them, summarised them and drew a PERT chart.

AND the Chief Programmer went unto the Project Manager and presented to him the estimate saying: "It shall take 10 months." And the Project Manager was not pleased and said: "I have brought you up from the depths of the staff; you have not grasped the Big Picture." And the Project Manager hired consultants, and authorised overtime and he spoke to the Chief Programmer: "Behold, see all that I have done! The Due

Date will be in five months." The Chief Programmer was much impressed and went from before the Project Manager and Proceeded to Implement The System.

AND the Chief Programmer sent his Analysts to the Users and said: "Let Specifications be written." And there were meetings, and lunches, and telephone calls. And the Specifications were written. And there was a Payday and a Happy Hour, one month.

AND the Chief Programmer examined the Specifications and saw that they were too ambitious. And he separated the mandatory features from the optional features; and he called the mandatory features "Requirements" and he called the optional features "Deferred". And the Users called him names. Lo, the Chief Programmer gave the Specifications to the Analysts and said: "Let the Requirements be analysed and let the Files be designated." And it was so. And the Chief Programmer said: "Let the Software Houses put forth their salesmen and let us have a Data Management System." And it was so. The Software Houses brought forth all manner of salesmen who presented their packages, and claimed wonderful things for them, each according to his own file structure. It came to pass that a Data Management System was selected; and the Chief Programmer saw that it was good. And there was a Payday and the Happy Hour, a second month.

AND the Chief Programmer said: "Let the system be divided into parts, and let each part be called a Module. And let programming teams be formed and let each be assigned to write a Module." And it was so. And the Chief Programmer created the programming teams with two levels, a greater and a lesser, and he called the greater the "Senior Programmers" and he called the lesser the "Junior Programmers". And he gave the greater dominion over the lesser. And the Chief Programmer saw it was good. And the Junior Programmers saw it differently. And there was a Payday and a Happy Hour, a third month.

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## SOFTWARE FILE

## Powerful version of IDMS launched

A NEW high-performance version of its database management system IDMS has been announced by the Cullinane Corporation, together with a data communications product and major enhancements to its Culprit report generator.

The company has at the same time revealed that it is to take over Mental Inc, a small Californian software products company. The acquisition is the first to be announced since Cullinane's highly successful launch on the US Stock Exchange earlier this year (Software File, August 17).

Mental's products, which Cullinane plans to integrate with IDMS, include systems for interactive text editing, word processing, and online program development.

Greatly enhanced efficiency in teleprocessing operation is the main feature of the new IDMS release, numbered 5.0. At field test sites, the enhanced software has achieved reductions of up to 80% in terminal response time, and 50% in elapsed execution time.

Much of this improvement can be attributed to the introduction of full multi-threading operation, the same innovation made by Cincom in its latest IBM-mainframe version of Total, release 6.0 (Software File, June 15).

Also contributing to faster execution is the provision of record level lockout. Protection against concurrent updates was previously implemented by locking at "area" level, which greatly increases the frequency of contention.

Other notable features of the new release are automatic recovery, warm restart, disc journaling, additional utilities, and an extended set of operator commands.

The new release also includes the nucleus of IDMS-DC, a teleprocessing monitor due to be released in the UK in the middle of next year.

Cullinane, which has not previously offered its own TP monitor, is understood to have implemented around 80% of the program handling task in the IDMS itself. The remainder, together with routines for mapping and screen handling, will be implemented in IDMS-DC proper.

A spokesman for Scicon, Cullinane's UK agent, noted that integrating TP monitor functions with the DBMS made possible a number of efficiencies, such as a single log file for both systems.

The DC nucleus functioned as a wait dispatcher and resource controller, he said, monitoring all online database activities and facilitating multi-threading. It would not, he added, duplicate the functions of existing TP monitors already installed, such as CICS or Shadow.

Enhancements in Release 4.5 of the IDMS/Culprit report generator include greater efficiency during multiple report runs, greater use of the Integrated Data Dictionary, and increased flexibility for database reporting.

A new facility is the ability to generate data definitions

## £1/2m profit for BIS

TURNOVER exceeding £5 million, with pre-tax profits of over £500,000, is expected by the BIS group for the year ending in February 1979. Last year, the group achieved £3.8 million turnover, with profits of £478,000.

## Moves on European agency for Omegamon

A EUROPEAN agency is being negotiated by Candle Corporation, of California, whose main product is Omegamon, a real time monitor for IBM's MVS operating system. The agent, when appointed, will also be responsible for marketing the firm's background performance monitor, Epilog.

Omegamon, installed at around 100 North American sites, provides real time displays for use primarily by operators and system programmers. It is local 3270, which may be either a dedicated 3270 or a TSO terminal.

By means of mnemonic commands, the user can format a display on the screen to investigate such areas as CPU and device utilisation, TSO activity, paging and swapping, and SRM performance.

Once formatted, the display will be updated automatically, response to pressing "Enter".

A major aspect of the system is automatic exception analysis. Intended to warn the operator of problems, this facility reports such conditions as disc dropped, excessive swapping, excessive address space waits, looping jobs, and page data set errors.

A further significant feature, and an explicit design aim, is high availability; Omegamon continues to function after

lockouts on the master system console, or lockouts caused by TCAM or Vtam.

Epilog, a more recent introduction by Candle, provides historic information on system performance for off-line use by performance analysts. The primary outputs are summaries of wait times, which the package is said to relate directly to hardware and software problems.

Epilog's principal use is thus in the analysis of system bottlenecks causing poor response time or low throughput. The system can also assist in the diagnosis of individual problems, such as a temporary increase in TSO response time.

Candle Corp expects to announce the appointment of European marketing and technical representatives for its products by the end of the year. As a possible guide to prices, Omegamon is sold under perpetual licence for \$12,500 in the US, with a \$100 fee for a 30-day trial period, and free use during conversion to MVS. No prices have been announced by the company for Epilog.

## DBMS acquired

THE Craydon-based bureau Lowndes-Ajax Computer Service has acquired the System 2000 database management package. The firm is thought to be the first IBM-based bureau in the UK to install System 2000, which was developed by MRI Systems Corporation of Austin, Texas.

## MoD contract for Scicon

SUPPORT for the WG34 helicopter development is to be provided by Scicon Consultancy under a contract awarded by the Ministry of Defence. The firm is to build mathematical models simulating the operational characteristics of the helicopter.

The models will describe the performance characteristics of navigation systems, sonobuoy monitoring, tactical data handling and torpedo deployment patterns and overall system effectiveness.

## ICL's 2900 Cobol may be adapted for 1900 series

ONE of ICL's "superstructure" products for the 2900 range, the C2 Cobol compiler, may be adapted by the company for its older 1900 series machines.

Users still developing 1900-type systems, whether for a 1900 or a 2900 under DME, would thus have the opportunity of writing forward-compatible application programs and minimising future conversion effort.

A 1900 version of the C2 compiler, which is said by VMW/B users to be of a very high

standard, is reported to be under consideration by ICL as C2\*.

Such a development would not only ease the migration path to 2900, but would also, in the view of one user, make available an excellent piece of software to continuing users of the 1900 range.

In contrast to its native mode operating systems for the 2900 series, which have attracted serious user criticism, many of the software superstructure products have been highly praised. Other language processors to have been specifically acclaimed include the Fortran F1 and OFC compilers (CW, February 16).

## IBM release

AN online query system originally developed by IBM as part of its relational database project, System R, has been released by IBM in the US as an installed user program. The software, Query-by-Example, is said to run under VM/370.

## Yesterday's branch office



## Today's\*



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MALCOLM PELTU REPORTS ON THE 'BIRTHDAY' SPEECHES OF ICL's TOP TWO

# Dr Wilson prescribes more Euro comms investment

URGING more co-ordinated European action across a wide spectrum of policies relating to information technology, ICL managing director Dr Chris Wilson last week stressed the importance of the development of European communications services with adequate high bandwidth capabilities and the establishment of a secure European source of advanced silicon technology.

The development of the right communications infrastructure is vital, he said, if the advantages of information technology are to be sufficiently exploited in Europe. However, he believes "previous efforts by European PTIs in this area have quite frankly left a great deal to be desired."

He also said, "We must make sure that European sources of technology are available. Total or over-reliance on foreign sources for technology is only a short step from similar reliance on the finished product."

Speaking at a Press briefing to celebrate ICL's tenth anniversary, Dr Wilson concentrated on his vision of how "data processing and informatics" will affect the way society develops.

Central to this vision was the creation of a world "in which the integrated television display with its own processor and file storage becomes as much a part of the home as the telephone."

This type of device, he said, will provide the home of tomorrow with most of its communications with the outside world and highlights the importance to modern industrial

society of having the most advanced communications capabilities, in particular the availability of high bandwidth systems, possibly using fibre optics for all telephone/television users.

"Communications is a fundamental need of any society," he said. "This means that the communications revolution must go hand in hand with the processing revolution made possible by silicon technology; and with the equally revolutionary changes in information storage technology currently being developed."

Dr Wilson did not refer to this report but he is obviously keenly aware that the challenges facing ICL over the next decade are likely to be very different from its first ten years, with the complex and unpredictable impact of information technology creating new market opportunities as well as new competitive challenges.

In the past, he admitted, circumstances had compelled ICL to take a very day-to-day approach to running our affairs. We have had to pull ourselves up by our bootstraps.

Now, however, he said that ICL was in a "sound take-off position and can begin thinking and acting far more strategically."

There were many complex implications resulting from the new integrated information services that are being developed. For society, Dr Wilson said, "most important of all is the establishment of a truly effective body of European law governing those topics which are of legitimate public concern and which have a special relevance to the informatics community and those affected by it."

"What we do not want to face is a mass of unco-ordinated national laws and regulations in this area. They would slow down the general progress of all of us through our legislators failing to understand the realities of the situation."

The areas identified by Dr Wilson for concerted European legal action include privacy and the protection of the individual against infringement of personal liberty, fraud prevention, electronic funds transfer, transnational data flows and copyrights and patent agreements.

An indication of the commercial reality behind the kind of development envisaged by Dr Wilson was highlighted by a recent report from US consultants International Resource Development Inc which predicted that the market for integrated Video Terminals, of the home-based communications system described by Dr Wilson, would eventually amount to "billions of dollars" (CW, October 12).

And that report suggested that the market for IVTs would be dominated by computers and electronics manufacturers, such as IBM and Texas Instruments, rather than by traditional TV makers.

Dr Wilson's European hopes on telecommunications developments were also tinged with a strong awareness of some of the practical problems of getting European authorities to act quickly and in unison.

He criticised previous efforts by European PTIs in providing adequate national communications infrastructures. "Urgent technical decisions have been taken too late and in a manner which takes too little account of what is going on and being achieved elsewhere in the world," he commented.

In particular, he praised the proposals of the US telecommunications giant, AT & T for its Advanced Communications Service (CW, October 26) as being on the right lines.

But he accepted that to support an advanced communications network requires high bandwidth capabilities which must "involve major public investment."

Dr Wilson therefore hoped that the subject would "hit the headlines more often with the social benefits being made very clear."

Addressing an audience of journalists from UK national, local and technical papers, Dr Wilson frequently stressed the role he believes the news media could play in creating a better and more informed understanding of the complex issues posed by information technology.

The information processing industry, he said, would provide increasingly efficient and effective technological capability but he challenged those in the Press, radio and TV to "generate the understanding, the discussion and the general will and desire to benefit from what can be provided for the enrichment of our lives."

While accepting that recent reporting on television on the impact of the micro had created considerable public and political interest and debate, the effect of the debate had been to create a "certain amount of alarm and despondency" to some extent by the emphasis in the programmes that the micro has made possible most spectacular advances: automation overnight and the threat of serious doubts as to whether society can absorb the social consequences of so rapid developments.

But, Dr Wilson said, he should be more confident in-depth judgments on the micro's impact. "I think that automation develops below the expectations of the numerous people governing problems that need to be solved."

Eventually he believed that pace of automation developments would accelerate dramatically but "in the meantime we have a headspace and must make the most of it."

This is based on perhaps the firmest piece of evidence that exists, a photograph of the chip (right) provided by IBM.

According to one observer, ICL's stock analysts, Morgan Stanley, in New York, relating the chip shown to the number of skin ridges on the fingers supporting it indicates that the chip is somewhere between 59,000 and 67,000 square mils in area. This is around twice the size claimed by Texas Instruments for its own recently announced 64K part.

The photograph also provides evidence to suggest that, as a major US memory user put it, "IBM's design is primitive."

What is known is that it is a bipolar device that is constructed as 704 TTL circuits on a single chip. This tends to indicate that IBM has selected an array circuit design technique, such as has been used for several years by Ferranti, with its uncommitted logic array devices.

This suggestion is borne out by the IBM statement that the circuit designer specifies the interconnections between the 704 circuits on the chip to meet particular system needs, this data being used for subsequent mask making.

It is further borne out by a comparison with Ferranti's latest ILLA range, the 6000 Series. Ferranti's device, at 484, has a lower "circuit" count, but it does have to cope with a wider variety of applications requiring a greater number of different circuits. It also has 48 interface circuits, of which no mention is made by IBM.

The nominal speed quoted by IBM is between 3 and 5 nanoseconds, compared to a typical 8 nanoseconds from Ferranti. Chip size for IBM is around 33,000 square mils, while the Ferranti part is a little larger, at 35,000 square mils.

The RAM guessing game... IBM only provides this photograph as a clue to what it is doing in the development of high capacity random access memories.

There is according to Rosen, evidence to suggest that IBM recently went "shopping" to buy a new MOS process, but that no deals were made, and that having proved that it can make devices using the older metal gate process with the 2K part, has opted to force it up in device complexity.

The final clue comes in the "guessed" access time of the 64K RAM. As the part is to be used only in the slower 8130 system, rather than the faster 8140, the industry speculation is that the IBM part has an access time of around 975 nanoseconds. This, as Rosen points out, is a rather pale shadow of the 110 to 150 nanoseconds of merchant market parts.

As a final thought on IBM's position on RAMs, the old process technology, and large chip size should mean, in relation to current semiconductor manufacturing practice, that the parts should be almost non-producible. Rosen points out, however, that IBM's history in semiconductor has repeatedly demonstrated that the company can achieve cost-competitive memory products, despite such disadvantages.

An equally small amount of information is available from the company on the new LSI logic device being used in the System 38 processor.

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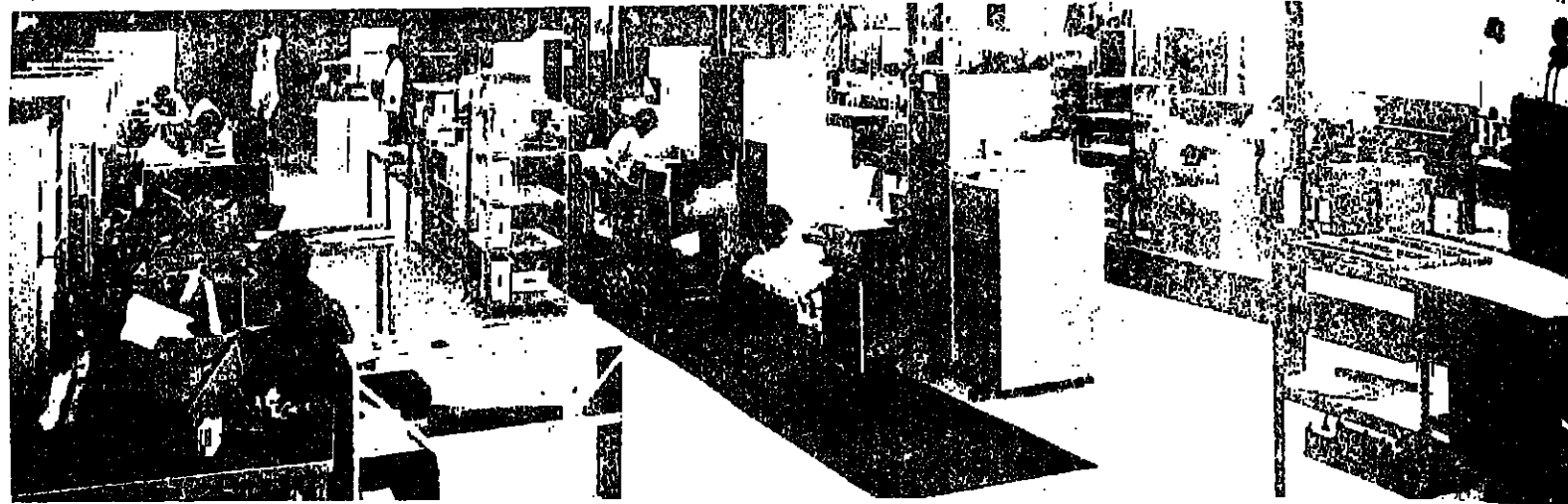
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Maintenance is something we all tend to take for granted: it is something which just happens, like the weather. Occasionally the service provided is excellent, most often it is just adequate, and users grumble about it but accept it. The fact that any company might actually carry out a continuous and intensive examination of its maintenance operation, constantly striving to increase customer satisfaction even if only by a percentage point or two, is almost inconceivable.

But computer companies do take maintenance extremely seriously, even if few can boast maintenance fanatics quite as single-minded and enthusiastic as Pier-Carlo Falotti, head of maintenance for DEC in Europe. Tim Palmer reports from Geneva.

© This is the interior of DEC's European repair centre for faulty modules brought back from customer sites by service engineers. The centre, at Horddons, Holland, houses all returned modules up to the latest specification, after which they are returned to regional service centres to be used again as required.



Tim Palmer talks to DEC's European customer services boss Pier-Carlo Falotti

## Promising is one thing—deliver is something else

"PROMISING is one thing — delivering is something else." That is the uncompromising dictum over the desk of Pier-Carlo Falotti, European manager of Digital Equipment's customer services organisation in Geneva.

Falotti is passionately dedicated to improving service to DEC's customers throughout Europe and the evidence suggests that this vital, but much neglected, aspect of the computer business is really getting better for DEC users.

"You reported in Computer Weekly a few months ago that IBM users were satisfied with IBM customer engineering, and quoted a satisfaction figure of seven out of 10.

"I was a little concerned at the report (CW, May 4), because our customer satisfaction rating — over a much larger sample than IBM's — averages 7.4 out of 10 in some countries and, at worst, is 7.1."

DEC has been conducting customer satisfaction surveys on its maintenance operation for four years throughout Europe, and for six years in some countries.

"We have consistently asked the 10 same questions, and four years ago, the rating varied between 5.8 and 6.2, so there has been a consistent improvement. The questionnaire is sent out to all our customers, and we get a 48 to 50% response, which represents about 5,000 replies.

"We do a computer analysis of the replies and classify them by product and by type of customer. We are getting a particularly high rating from our 'critical' customers, those with applications for which downtime is materially damaging.

"Such customers have a superior maintenance contract which guarantees a better response time and 24 hours a day service compared with the standard contract."

"That sounds encouraging, but Falotti is never satisfied with anything less than perfection.

"The rating should be the same regardless of the type of maintenance contract, because those with the standard contract have lower expectations.

"I will never be satisfied with anything less than 10 out of 10, but I know we can never achieve that: customers tend to be exigent when they fill in questionnaires.

"On the other hand they tend to mark people-related questions higher than impersonal ones, because they don't like to say nasty things about the guy who comes to visit them."

This can be seen from a detailed breakdown of the figures. Customers are asked to circle digits from zero to 10 against

each question, and are told that zero means unacceptable, five means average and 10 means outstanding.

The highest rating, 8.5 from those with critical contracts, is given for "attitude of engineer", next highest is competence of engineer, rated 7.5 for both types of contract.

At the other end of the scale, lowest mark, 6.5, is given for preventative maintenance on standard contracts, and this also rates low at 6.8 with critical contracts. The lowest rating in the latter category is for repair time, which is rated 6.6 out of 10. Availability of spares is also rated low at 6.8 by both sets of customers, and looks like an area where it would be comparatively straightforward to improve the rating next time.

The other categories, each of which is rated 7 or better by both

blem and our biggest challenge, and our rate of growth makes it worse.

"We can still find trained people in the UK, which is why we have a service organisation there which is more than twice the size of those of all other minicomputer manufacturers put together — including IBM's Series 1.

"In France we recruit from a national training school for people wanting to go into electronics, and in Germany from the Control Data Institute. We then teach them general computer science, trouble-shooting and English.

"We recruit between one in 10 and one in 20 of the candidates we interview, and each is interviewed by at least two people. As a result, only IBM has a lower turnover of staff.

"In Italy we advertise, and offer a grant during training. We



Falotti... I will never be satisfied with anything less than 10 out of 10, but I know we can never achieve that: customers tend to be exigent when they fill in questionnaires.

sets of customers, are overall quality, which gets 7.2 on standard and 7.4 on critical contracts; response time; overall reliability; and field service management.

Falotti is convinced that far from being a fringe activity, quality of maintenance can make the difference between winning and losing business.

"Maintenance is a pre-dominant cost, and so serviceability of a product is also crucial. Good preventative maintenance can improve the reliability of a system, but you have to weigh up the costs of too much downtime with the costs of too much preventative maintenance, and the crossover point of the two curves is different for each model.

"People are of course what a good maintenance service depends upon.

"People are our biggest pro-

average 300 replies and 12 recruits per advertisement.

"We have specialised training schools, one for CPUs, another for mass storage devices and a third for systems.

"The students start with a spell in the office to get the feel of things, then do a month in class, covering basic appreciation and basic trouble-shooting.

"Over the next three months they are allocated according to aptitude, and spend half of each day doing a self-paced instruction course. So they do not have to spend three of four months sitting in class."

DEC's service business is organised as a world-wide profit centre. "That way, we have the resources we need for investment where it is needed, and ensures that we get our priorities right."

"Traditionally maintenance has been a hardware special-

tion, but at the higher end of our line, maintenance engineers have a system rather than a hardware orientation. The emphasis has switched from IBM software to nearer 50% after all, if customers use DECnet, we have to have engineers who understand DECnet.

"This provides a clear career path, because there are new specialisations which need to exist."

"We have a world-wide engineering review board which assesses the capabilities of individual, and people move to become systems and application engineers designing 'like' networking systems."

"We do find a difference between different countries: people from the Mediterranean area tend to want to end up as the boss, whereas Americans do not care so long as the money is good. But passing to a higher level via the review board offers a means of giving individuals enhanced status."

With a significant number of multinational customers like Chemical Bank, DEC maintenance engineers are often travelling from country to country, which raises some major problems.

"We have an international network of spare parts which is maintained according to the rate of consumption, and we used to transfer the data on stock levels and so forth by means of magnetic tape. But it is getting harder and harder to transfer data across borders so we are going to have to find another way to do it."

Similar problems arise when engineers try to talk parts through customs.

"As long as parts can be found, we will go on maintaining old machines. We have even opened a factory in Salem, Massachusetts, which specialises in making parts for obsolete products, including things which we used to buy from companies which have since gone out of business."

"In Europe, we also have a central module repair facility in Holland."

"Each module sent there is updated to the latest release and goes through the full test sequence at the end of which a success rate of 98 to 99% is achieved. The module is then sent back to the factory and not unpacked until it is withdrawn from stock."

A new service contract, designated DECservice, is being introduced, which will include remote diagnostics of the test systems, like the VAX, and later the PDP-11, all looking to enhance further the service to the customer (CW, October).

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This is the third in a short series about the BCS Specialist Groups. John Race, a senior lecturer in computer science

at Brunel University, outlines the activities of the Microprocessor Specialist Group, which will be taking

part in the BCS 79 Living with Computers conference and exhibition in London from January 4 to 6.

## BCS group assesses the impact of the micro

MICRO-ELECTRONICS and microprocessors are, arguably, the biggest things in computers since the transistor. Their effects on hardware and software are already profound, and may extend out of our own profession to change the jobs and lives of everybody.

The Microprocessor Specialist Group was inaugurated in November 1976, with the aim of exchanging information on hardware and software developments and applications in programmable micro-electronics; promoting the use of relevant software methodologies and techniques; and assisting members in dealing with suppliers and distributors of micro-electronics.

We try to achieve these by holding meetings, about five times a year, at which an author-

At BCS 79 the Microprocessor Group will exhibit various working devices and there will be discussion on the impact of micro-electronics, led by Derek Roberts, managing director of Plessey Micro Systems; Alex d'Agapeyeff, chairman of CAP; and Keith Chapple, managing director of Intel UK.

It is expected to cover such topics as: should the UK concentrate on using micros, making them or developing software for them?

You are invited to join our meetings and information can be had from the BCS (01-637 0471).

When considering the impact of microprocessors there seems to be three possible areas of discussion: The impact of micros on life in general, on the UK economic scene, and on the professional.

In dealing with the first, a vigorous but emotional debate has begun on the impact of micros on the quality of life. We are fairly sure they will be as influential as steam, cheap electric motors, and transistors.

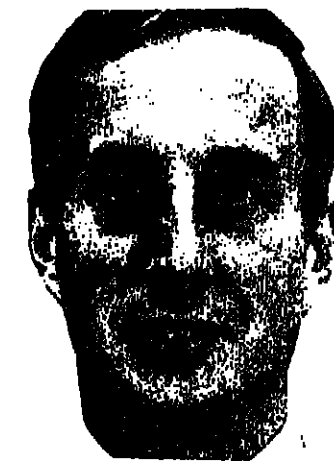
We can say, too, that the computer professional has perhaps more responsibility than most, and should act as a watchdog, giving warning when his devices look like turning antisocial.

This topic is splendid for debating, but at present involves more speculation than calculation.

In respect of the UK economic scene, the issue seems to be, what priorities should be given to manufacturing micro-electronic components; developing software and systems using foreign components; using foreign software systems and components in our products and processes?

Arguments for the first are increased employment, decreased reliance on foreign imports, hence a better balance of payments and less chance of political blackmail, and a chance of commercial success. The arguments against are that we are late in the field, and that our market is smaller than that open to the US manufacturers.

The arguments in favour of the second point are that our costs are low and our skills are high in putting together packages for other countries to use.



John Race

ritative speaker reports on his company's or institution's activities and plans in the field.

Our policy has been not to try to devise or impose standards in this field, or to take sides in the debate on whether microprocessors are a curse or a boon to the computer professional, the manager, and the man in the street; nor have we yet published anything. Instead, we try to educate ourselves by listening and talking.

Non-members of the BCS are welcome to our meetings — everyone pays 50p at the door. It should be noted that membership or affiliate status is, however, worth having: for example, the cost of attendance at BCS 79 is reduced by more than the cost of becoming an affiliate.

### Now Fairchild sues DG

THE long-running litigation between Data General and Fairchild has taken a new twist, with the news that in the San Francisco Federal Court, Fairchild is counter-suing Data General, alleging an attempt to prevent competition.

This follows a suit from Data General against Fairchild (CW, May 12, 1977) which has alleged misappropriation of trade secrets and violation of software licence agreements between the two companies.

Earlier this year (CW, May 4) Fairchild replied to the Data General charges, and asked the

Delaware Chancery Court to dismiss the case.

The subject of the suit and counter suit is Fairchild's 9440 16-bit microprocessor, which can emulate the Data General 1200 computer. Data General alleges this is a violation of trade secrets, Fairchild, in its counter-suit, alleges that DG's suit is:

"an attempt to impede a natural and highly useful course of technological development and advancement."

Fairchild has under development a new micro, the 9445, which, it is suggested, will emulate Data General's Nova 3.

### Package for architects

A SMALL hardware and software package aimed at architects, engineers and surveyors has been introduced by the Royal Institute of British Architects with a view to easing the design task involved in assessing energy efficiency in buildings.

The package is based on a Texas Instruments TI-99 calculator, coupled with a PC100B print cradle. The software is a

suite of nine programs written by the RIBA Energy Group. The first of these will calculate thermal efficiency in buildings.

The energy group, Pat O'Sullivan from UIVIST, architect Richard Burton and RIBA energy consultant Will Pascall are committed to expanding the range of programs available as part of the package, and are looking at such areas as acoustics and daylight factors.

Since hardware costs continue to fall, the proportion of value added to the package by software and innovation tends to rise. The argument against is that sooner or later we put ourselves out of business.

The argument for using foreign components is simply that we have got to improve our productivity and quality to remain competitive. The argument against this is simply that trying to remain competitive implies fewer jobs, which is unacceptable to the unions.

It is the impact of micro-electronics on the design engineer, the production controller, the accountant, and the DP manager or analyst that perhaps concerns the Microprocessor Group most directly. It seems very likely that micros are going to change their jobs radically. This has arisen because Grosch's famous law ("You can get four times the CPU power

for twice the money") is no longer important. Everyone can have a calculator for petty cash, a computer for a few thousand.

Will this lead to bad programming, unsafe systems, and loss of central control as databases fly out of head office and roost in regional offices or even individual clerks' desks?

Can the DP manager survive the loss of his big mainframe, and have even more influence on his company by providing a training, ideas, and software service for other people's hardware?

Our group is active in providing a platform for the exchange of information on techniques for professionals of all kinds who believe they need to know about micros.

We think that we should not try to cover all the enormous issues raised, but concentrate on what they mean to the professional.



A new line of calculators with plug-in function modules has been introduced by Monroe International, a division of Litton Industries. Called the Monroe 2850 series, there are six models, ranging in capabilities from a simple printing version up to the 100-step programmable/printing machine which also has 48 registers that retain data in memory even when disconnected from the main power supply. Nine different function modules are available, allowing the user to build up his own personal library of capabilities. The picture shows the Monroe 2850 with its easily changeable function modules.

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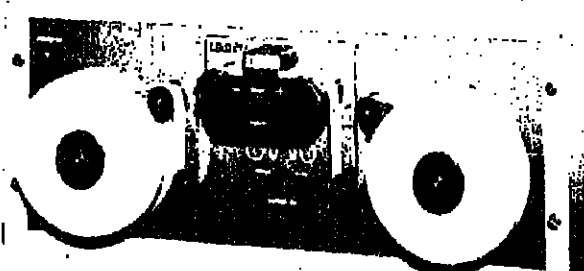
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# New light on transmission of information

THERE is nothing new about the idea of using light to carry vast amounts of information. In the nineteenth century, Alexander Graham Bell was keenly interested in the basic concept of optical communications, and he experimented with what he called a "photophone", a system for carrying messages by means of sunlight reflected from mirrors.

However, two research breakthroughs were needed before optical communications could become practical. The first was the discovery of a suitable light source. Light from the sun or lamps cannot provide the concentrated narrow band of frequencies necessary for communications applications.

The answer came in 1960 with the first demonstration of the laser, a device which gives off a concentrated beam of light at a single frequency.

The second major breakthrough was the discovery of how to make a suitable optical transmission medium. Transmission of light beams through the atmosphere is severely limited by fog, smog, rain and snow.

However, specially made glass fibres can trap light waves and carry them for several miles with little loss in signal intensity.

Today's fibres are so transparent that light loses more intensity passing through an ordinary window pane than it does in 500 feet of fibre. Put another way, if seawater were as transparent, one could easily see to the bottom of the deepest ocean.

In terms of system components, optical links are no different from any other communications setup. You still have a transmitter, a transmission medium and a receiver.

The transmitting source may be either a solid-state laser or a high-radiance light-emitting diode; the receiver uses a photodetector, which is generally a silicon avalanche photo-diode.

What makes optical transmission so radically different is the fact that it substitutes a stream of photons for a stream of electrons. This means that the optical circuit is totally isolated electrically, so it is immune to electromagnetic interference, does not generate inductive crosstalk and is not susceptible to the crosstalk of neighbouring copper circuits.

There is no need for extensive earthing loops or bulky cable shielding, and short circuits are harmless, even in an explosive atmosphere.

Further, since signals do not radiate from fibre cables, they resist intrusion. A simple, well-designed cable would have to be broken into for an intruder to gain access to the information. Also, the very weak dependence of optical loss on frequency and temperature simplifies the design of receiver electronics since no equalisation is required.

Optical fibres have the advantage of being thinner and lighter than copper wire, yet they have the tensile strength of steel. They also have a far larger information transfer capacity than copper wires.

A single fibre has already carried more than 30,000 telephone messages over a distance of six

miles in a demonstration and the theoretical capacity of the fibre is on the order of 1,000 Mbps.

There is another good reason for switching from copper wire to optical fibre in view of the growing strategic importance of copper as a scarce raw material.

Despite these benefits of optical fibres, none of them warrants the effort required to develop fibre optic technology, in the view of Dr R. D. Maurer of Corning Glass Works, Corning, New York. To him, cost has always been the dominant motivating factor.

Fibre costs have dropped dramatically to about \$1.25 per metre, but this figure is still high because of the laboratory environment in which fibres are made.

Assuming a normal operating plant production environment, Dr Maurer believes that present technology can reduce the cost to 10 to 20 cents per metre for annual production volume in the

total attenuation of 20 dB/km. Subsequently, Corning reduced fibre losses to 8 dB/km, and in May, 1973, Bell Labs scientists announced glass fibres with losses as low as 5 dB/km. At this level, attenuation in the fibre accounts for 50% of light loss over a distance of 2,000 feet; this meant that repeaters in a fibre optic system could be placed further apart than repeaters in the land cable systems then in service.

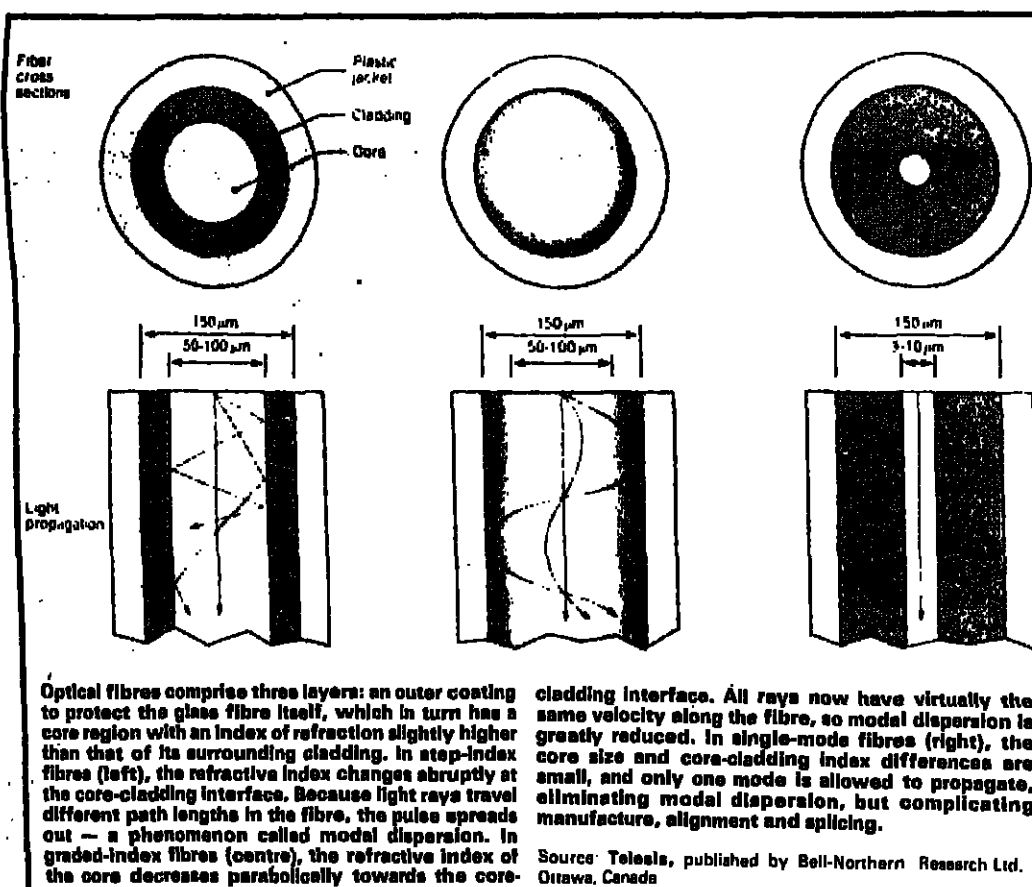
Corning later reduced attenuation to 4 dB/km and in May, 1974, Bell Labs reported losses as low as 1.2 dB/km at the infra red wavelength of 1.06 micrometres, or microns. Now, Corning can produce kilometre lengths of such fibres. The lowest attenuations reported have been about 0.5 dB/km.

To obtain such high transparency, optical fibres are designed so that the light never comes near the outside surface of the fibre. Rays that enter parallel to the central axis of the fibre will normally travel a shorter distance than those entering at an angle which cause them to side to side as they travel down the fibre. As a result, a light pulse made up of a combination of rays becomes spread out over time.

This phenomenon, known as modal dispersion, limits the pulse rate, and thus the information capacity of the optical communications system. The dispersion can be greatly minimised, but not entirely eliminated, by grading or shaping the refractive index of the core to compensate for the different distances that the rays travel.

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Optical fibres comprise three layers: an outer coating to protect the glass fibre itself, which in turn has a core region with an index of refraction slightly higher than that of its surrounding cladding. In step-index fibres (left), the refractive index changes abruptly at the core-cladding interface. Because light rays travel different path lengths in the fibre, the pulse spreads out — a phenomenon called modal dispersion. In graded-index fibres (middle), the refractive index of the core decreases parabolically towards the core-cladding interface. All rays now have virtually the same velocity along the fibre, so modal dispersion is greatly reduced. In single-mode fibres (right), the core size and core-cladding index differences are small, and only one mode is allowed to propagate, eliminating modal dispersion, but complicating manufacture, alignment and splicing.

Source: Teleols, published by Bell-Northern Research Ltd, Ottawa, Canada

range of 10,000 to 100,000 kilometres.

Dr Maurer states that optical fibres could have been used years ago but the repeater spacing would have been too short for economic systems because the existing fibre attenuation was too high.

Today, he says, attenuation is no longer regarded as a major problem area and receives little research attention.

Instead, the focus has shifted to other practical problems, such as increasing the information capacity, and developing techniques that allow fibres to be made long and strong and to be drawn rapidly while still maintaining dimensional precision.

Fibre attenuation has been dropping steadily since November, 1970 when Corning reported two 30 metre sections of fibre optic waveguides with a

of the fibre, where dust, scratches or contact with other surfaces would cause serious losses.

Each fibre comprises three layers. The outer layer is a coating, usually of plastic, that provides protection from scratches and abrasion which could weaken the fibre and lead to breakage under stress.

Within the protective coating, the glass fibre itself has a core region with an index of refraction slightly higher than that of its surrounding cladding.

Because of this higher refractive index, rays that enter the end of the fibre at a shallow angle to the central axis are reflected back into the core when they strike the interface between the core and the cladding.

Rays that enter the fibre at large angles to the axis escape without being reflected. Pro-

cesses in which the refractive index decreases with radial distance away from the centre. Since light travels faster in regions of lower refractive index, it is possible to adjust the variation in refractive index so that all rays arrive at their destination at close to the same time.

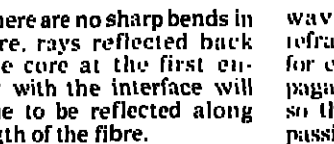
Writing in the August, 1977, issue of Scientific American, W. A. Boyle, executive director of Bell Labs' research and communications sciences division reports that these "graded-index" fibres have reduced modal dispersion by a factor of 2.5 compared with "step-index" fibres in field tests.

Optical fibres also suffer from chromatic dispersion, which arises as a result of the slight differences in the refractive index of the glass for different optical wavelengths.

All sources of light contain a finite packet of optical

## By Morris Edwards

Ever since the development of electrical communication methods, work has gone on to improve the quality and the capacity of the transmission medium. The use of light to carry information has been experimented with since the days of Alexander Graham Bell, but until the advent of the laser and the optical fibre this technique had not been practical. Now, communications systems based on fibre optics are becoming a reality and in this article Morris Edwards discusses some of the latest developments.



wavelengths, and since the refractive index differs slightly for each wavelength, their propagation velocities are different, so the pulse spreads out while passing down the fibre.

For sources with a large wavelength spread, such as light-emitting diodes, chromatic dispersion can limit system bandwidths and/or length. With solid-state lasers, which have a very narrow spectral spread, chromatic dispersion is negligible.

According to Dave King and Otto Szentesi of Bell Northern Research, modal dispersion in step-index fibres limits the maximum bandwidths to about 35 MHz-km. Writing in the February, 1977, issue of their firm's technical journal, Teleols, King and Szentesi report that graded-index fibres may have bandwidths greater than 500 MHz-km, and they consider such fibres to be the leading candidates for communications applications.

One way to prevent modal dispersion is to limit the core size and core-cladding index differences so that only one mode is allowed to propagate along the fibre. Such single-mode fibres have been fabricated with bandwidths as high as 2 GHz-km, but their small core size creates difficulties in obtaining low attenuation.

The small diameter, about two to four microns, also greatly complicates aligning a light beam into the fibre and makes alignment and splicing of fibres extremely difficult.

Sources for optical communications systems may either be LEDs or lasers, both of which are comparable in size to the optical fibre, which makes for easier coupling. Both are also capable of being modulated at very high rates. Many modulation and coding techniques may be used, but the binary on/off modulation of the light source is the most practical. Analogue information, such as voice or video, must first be digitally encoded; it may then be transmitted, along with data, as a stream of light pulses through the fibre to the receiver, where the photo-diode reconstitutes the original electrical signal.

The wavelength of the light source greatly impacts the transmission performance. Light losses in fibres arise from two distinct effects. One is absorption of light by impurities embedded in the fibre material. The losses can be reduced, but it is difficult to eliminate them completely.

Another source of loss is scattering of light inside the fibre (Rayleigh scattering). This loss decreases continuously as the wavelength increases and reaches a minimum at wavelengths between about 1 and 1.2 microns.

Dispersion also reaches minimum values at wavelengths in the vicinity of 1.2 microns, so to keep both attenuation and dispersion as low as possible, the wavelength should be in this range.

LEDs made from gallium arsenide, GaAs, which emit at a wavelength of about 0.8 microns, are satisfactory. However, Bell Labs' Boyle reports that semiconductor materials

are under investigation which promise a better wavelength match for optical fibres.

Until recently, the only practical semiconductor laser for optical systems was the gallium arsenide laser, which emits a wavelength between 0.8 and 1.0 microns.

Research on new semiconductor materials at Bell Labs, however, has shown that adding antimony to gallium arsenide is an effective way to "tune" the laser. By increasing the amount of antimony in gallium arsenide antimonide, the light emission can be continuously tuned to any wavelength between 0.9 to 1.2 microns.

Already, such lasers have operated for as long as 21 hours, which is encouraging because GaAs lasers, which now have a life expectancy of over 10 years, lasted only a few minutes in their earlier laboratory versions.

In a report entitled "Fibre optic communications," the National Research Council of Canada compares light sources to a light source, since it is suited for multi-mode propagation.

However, LEDs spread light over a wider angle than lasers, so less output power can be coupled into the fibre. The output of LEDs, however, is more linear than lasers and LEDs can be operated continuously with little or no effect on their lifetime.

Lasers can be operated continuously (on), but the cost is presently high and the lifetime is generally limited to 4,000 hours. Nearly all of the commercial LEDs used for fibre optic communications systems are developed on the Buras diode developed by Bell Labs by C. A. Burras in 1971.

Lasers have two main advantages as light sources. Because the light emerges from the laser in a narrow beam, it is possible to couple a large fraction of the radiation directly into the end of an optical fibre. Secondly, the small spread in colour of the laser light minimises chromatic dispersion.

In the receiver, photodetectors capture the photons emitted by the laser or LED source and convert them into electrons. There are two types of photodetectors: "pin" and "avalanche".

Pin photodiodes are used for low-speed applications and have a response time of about 10 ns. Avalanche photodiodes have a response time of about 1 ns and are used for high-speed applications.

Since they respond to a wide range of wavelengths, between 0.8 and 1.15 microns, they are well suited for use with the laser and LED sources used in optical systems. Response times are well suited for use with the laser and LED sources used in optical systems.

Silicon avalanche photodiodes have the best signal-to-noise ratio, the highest quantum efficiency and the lowest dark current. They are well suited for use with the laser and LED sources used in optical systems.

In 1977 Shell's heating and agricultural division placed itself in the vanguard of developments in the group by deciding to introduce distributed processing techniques to its

authorised distributor network. Following a detailed investigation in-house and a comprehensive study done in conjunction with the distributors, this decision has now been implemented in 18 out of an eventual 30-35 locations and has already met all its promised cost justification. This is the background to the distributed processing case study by Ruth Stein.

# Oiling wheels of a distributed net

## By Ruth Stein

THE heating and agricultural division handles all Shell's UK oil sales to the domestic central heating, agriculture, small industrial and commercial sectors of the market. This is channelled through approximately 45 authorised distributors, all substantial businesses in their own right, who cover specific franchise areas. A typical distributor, for example, handles 10,000 customers, employs 50 people and turns over approximately £5 million per annum. The division's association with this network is close, providing a number of service and support activities.

Computerisation was first introduced in 1975 when the division's routine data processing needs were handled by a leading bureau. This was designed as a single entry sales ledger system to control customers' accounts.

It required input data to be recorded on a batch basis and sent by post to the bureau where it was read optically and processed. Speedier than manual operations, it suffered from the inherent inflexibilities of batch processing.

In 1975 a look at Shell Canada's newly installed minis acted as the catalyst for a full-scale reappraisal of the division's computing techniques. The bureau was anxious to enhance the batch system in order to eliminate sequential processes and some distributors were pressing for more sophisticated handling, in particular those companies with large customer lists.

The decision to implement a fully integrated real time minicomputer-based system was made after all other alternatives had been rejected. The major factors which led to this were the desire of the authorised distributors for their own systems, the favourable economics of distributed processing within Shell's own marketing structure and the marketing advantage such a system could provide in the increasingly competitive market.

The objectives of the system definition were to produce a workable system controlled by the authorised distributors at each location and generating as little paper as possible.

Routine operations were to include order capture and invoicing, the central heating and boiler maintenance service, customer accounting, customer master records, purchase ledger, automatic credit control and comprehensive retrieval facilities.

It was decided at the outset that interlinked systems were unnecessary, but that an online link with Shell's own computer centre could eventually be desirable.

The division did not have any pioneering instinct and mandatory criteria for the eventual choice of hardware were: known capability or implementation on the part of the contractor, the use of proven hardware and operating software and guaranteed maintenance and support.

The company was specific about its requirements: "A

multi-functional interactive real time computer system is one where all information necessary to process transactions is stored within the computer and is available for interrogation at all times to be used selectively and randomly to process all transactions required to conduct business.

"All functions of the system can be performed simultaneously through a number of VDUs with information being produced visually and/or in printed form. Response by the computer to any action initiated through a keyboard linked to a VDU must be less than five seconds in all circumstances and must average no more than two to three seconds."

When the choice of supplier was made, it aligned on a company which had already implemented a minicomputer-based system in a fuels distribution company and written special applications software. Computer Design Systems of Manchester proposed a DEC-based system operating under Mumps, and a typical installation is now centred on a 98K-byte PDP 11/34 with 40 Megabytes mass storage, eight to nine VDUs and four to five printers.

Two pilot exercises, at Pilot Oils of Nottingham and Fuel Services (Garstang), were in operation during the winter of 1976/77. A 100% DEC solution was soon found to be too expensive, although Shell would have preferred a single manufacturer, and experiments were made using different peripherals and terminals.

The choice of VDUs for the project was one of the most significant. There would ultimately be approximately 300 VDUs within the network, a factor which made selection particularly price sensitive, and these would most immediately represent the total system to the users. This meant a simple, rugged device without any complex capabilities.

The success during the pilot installation of the ADDS Consul 520 from Terminal Display Systems was sufficient to ensure its recommendation from CDS and the distributors involved in using it.

One great advantage of the ADDS terminal was its acceptability to users. It appeared to need little maintenance and its dark-on-light screen was comfortable for people to operate. Its UK supplier was a specialist in VDUs and was local to CDS.

The benefits highlighted by the pilot scheme results were the ability of the companies concerned to take a more positive view of their customers and the strength which accrued to Shell in planning its marketing policies.

While certain changes were made in detail, the approach has remained the same in the system which the heating and agricultural division is now mid-way in installing.

The division's users now acknowledge the workability of the system. The sales involved

have visual display units and printers (Centronix 701). The distributor's staff input orders and produce priced delivery tickets. All customer accounts are accurately updated daily. Automatic credit control prevents inadvertent deliveries to bad credit customers and engineers' calls are scheduled to make optimum use of their time.

One application which is es-

entially complex, and had previously been handled manually with varying degrees of success, is boiler maintenance, charging and administration. This involved a 3,000 spare-part file and the new system now handles all charges for parts, engineers' calls, insurance and stock control. It is eventually hoped to institute completely automatic re-ordering of spare parts.

An extension to order capture is the ability to calculate how much heating a customer uses so that a tank refill can be scheduled without the customer needing to order. Future applications will include the prediction of supply and demand among non-heating customers. Shell has found that users at Authorised distributors have had little difficulty in adapting

to the system. Key personnel are trained one month in advance of the arrival of the system, usually four people per site, through an intensive one-week course, and the division's own staff provides systems management skills.

A divisional implementation team also ensures that targets are met, supervises the data take-on period, and ensures on-the-job training.



Using an ADDS Consul 520 video terminal supplied by Terminal Display Systems, Yvonne Bloor of Pilot Oils, Nottingham handles customer accounts and administration on the network. This is one of 300 terminals which are being installed by Shell throughout the UK.

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We urgently require a minimum of 2,000 experienced Programmers to help fill current client requirements throughout every major town and city within the UK. Clients include Banks, Burgues, Computer Manufacturers, Consultants, Distributors, Engineers, etc. All Programmers, irrespective of background, currently interviewed as a lucrative new career opportunity, should apply urgently to EMS via the attached application form for interviews in the areas of their choice for every local employer able to offer the job interest and salary required. Hardware includes IBM, Honeywell, ICL, NCH through to mainframe.  
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EMS is planning substantial further development of both our Consultants and Turnkey Systems Divisions during the coming months. Our Consultants activities extend across all maintenance ranges and encompass a wide range of industrial/commercial organizations. Applicants must, therefore, possess a high level of Business Analysts capable of rapidly assessing clients' requirements and proposing solutions involving software, hardware or a combination of the two. They must also possess a proven track record in sales and marketing, preferably in the computer field. The successful applicant will have a proven track record in sales and marketing, preferably in the computer field. The successful applicant will have a proven track record in sales and marketing, preferably in the computer field.  
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#### ASSISTANT SYSTEMS ANALYST APS £4773-£5073 p.a.\*

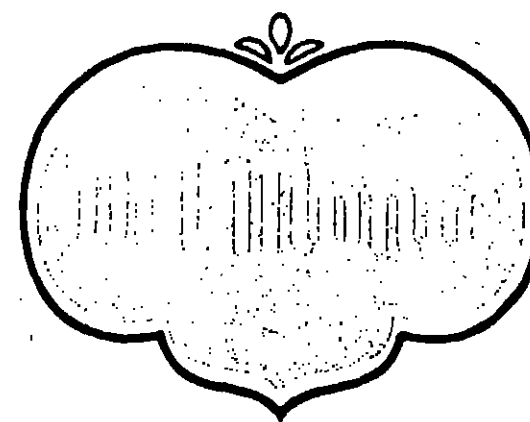
Required in the Accountancy Division at County Headquarters, Cardiff, to be responsible for the Principal Systems Analyst in the detailed design and implementation of computer based systems, processing systems, and the successful applicant may also be required to undertake some programming for specific applications. Previous experience of systems analysis and COBOL programming in commercial applications required. Full job description available with application form.

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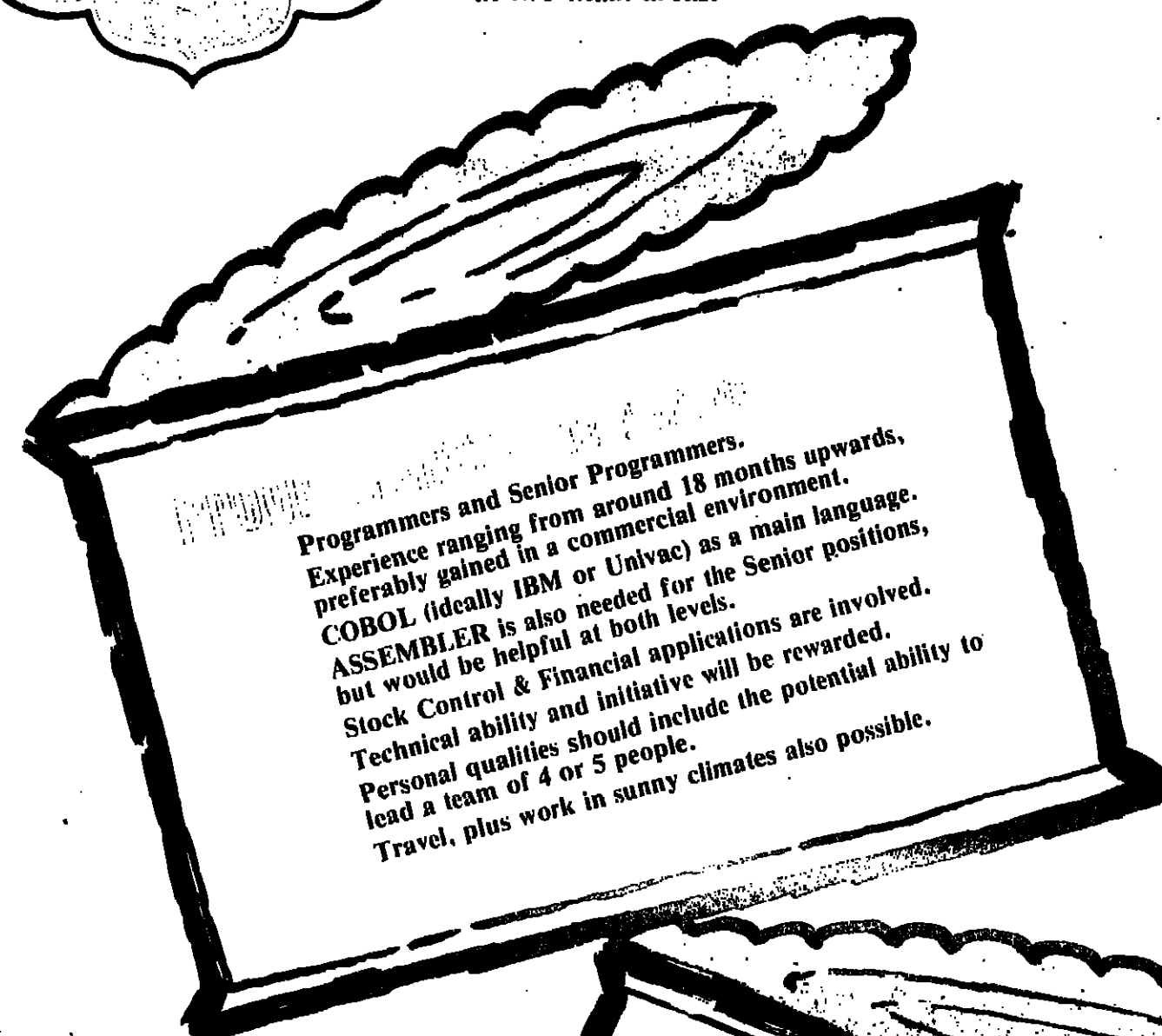
\*The salaries quoted include a supplement which will vary with overtime and other similar responsibilities.

Application form, returnable by Monday 12th Nov 1978, to the Personnel Officer, County Treasurer's Department, Newport Road, Cardiff (Tel. 0222 488022).

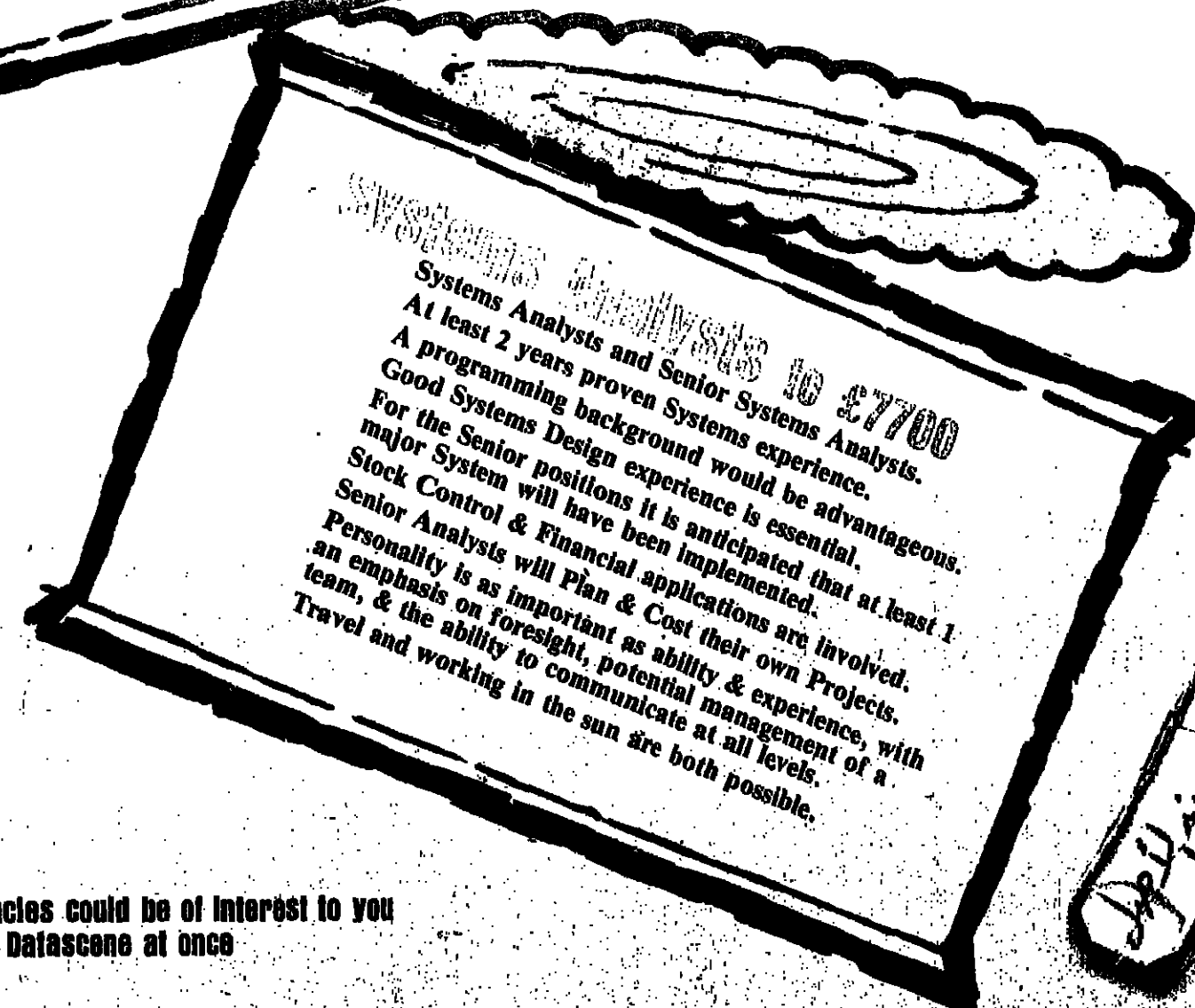


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Four years' experience is required with at least two years' of recent Honeywell experience, utilising COBOL 68 and Integrated Data Store (IDS) programming language.

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Three years' experience is required in the area of software support and maintenance for Honeywell's TDS. Knowledge of GRTS/NPS and GMAP programming.

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Broad experience is required in defining user requirements for the development of data processing systems/program specifications in the area of financial or aerospace engineering and production systems.

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Letters of enquiry, giving details of qualifications and career so far, to: Dr. B. Richards, Dept. of Computation, UMIST, PO Box 88, Manchester M60 1UD.

Please quote reference COM/9886 (A) or COM/UBCB (B) on application.

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For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

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Educated to degree standard you should have several years' experience of designing systems, and a background knowledge of stock control and stores procedures would be useful. Salary is in the range £5,253-£6,237. Applicants, male or female, should write giving details of age, experience and qualifications to Appointments Officer, Scottish Gas, Granton House, West Granton Road, Edinburgh E65 1YB. Closing date for applications 16th November, 1978.

SCOTTISH GAS

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Application forms and further particulars may be obtained from the Registrar, The University, P.O. Box 147, Liverpool L69 3BX.

The closing date for receipt of applications is 17th November, 1978 and it is hoped to hold interviews towards the end of November.

Quote Ref. RV/985/CW.

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Application forms and job description from Regional Administrator, North Western Regional Health Authority, Gateway House, Piccadilly South, Manchester M80 7LP, telephone number 061-235 9455 Ext. 425. Closing date 9th November 1978. Please quote reference number 1800.

For an informal discussion on the post, please telephone John Berry on 061-288 3488 Ext. 305.

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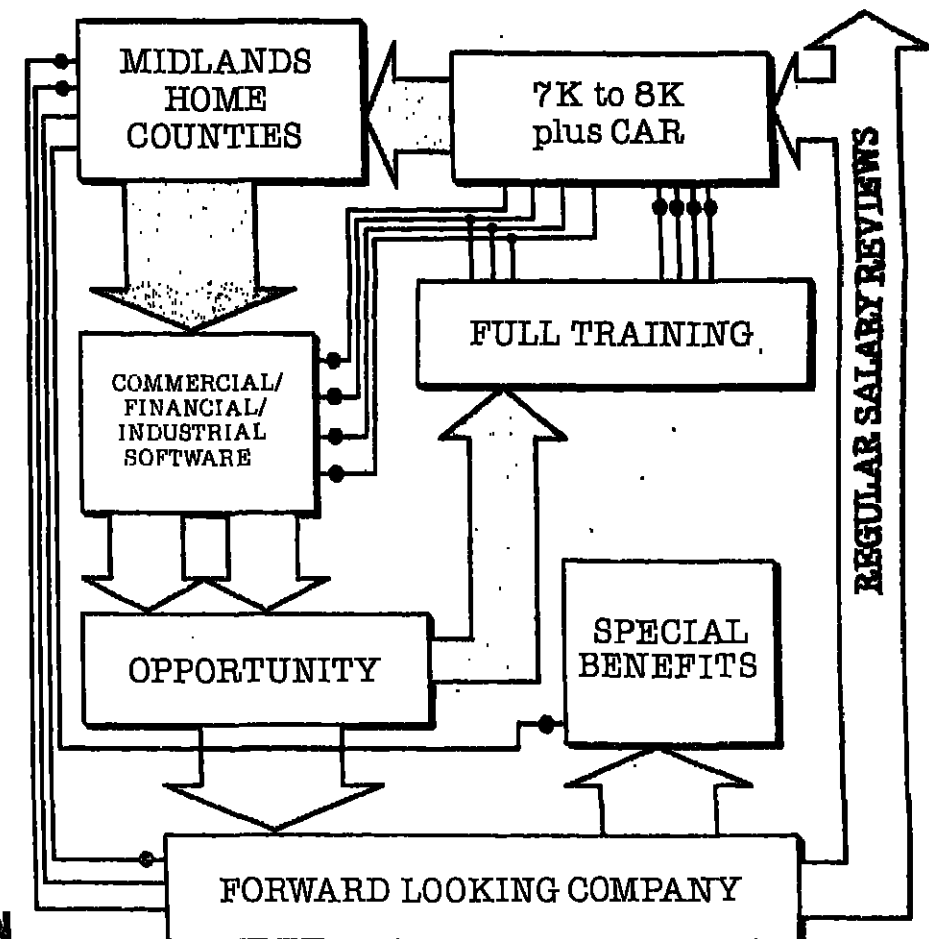
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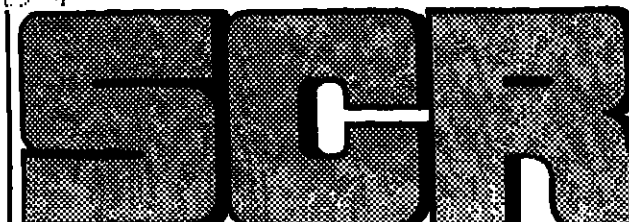


Computing Services Association

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 Freeport 13, 3 Mandeville Place,  
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The Polytechnic has recently installed a DEC-20 in its computing department. This post will require a good working knowledge of DEC-20 and the Administration programs currently being converted. This post will require a good working knowledge of DEC-20 and the Administration programs currently being converted. However, knowledge of ICL 1800 COBOL or PDP 11/10 is also an advantage. It is unlikely that all candidates will have worked for less than three years with DEC-20. Considered sufficiently qualified.

Salary 801-£4820-£5268 plus supplementary

Further details and form of application available from the Assistant Director and Chief Administrative Officer, Trent Polytechnic, Burton Road, Nottingham. Closing date: 17th November, 1978.

**TRENT POLYTECHNIC NOTTINGHAM**

### SYSTEMS ANALYSTS

**NORTH SURREY** To £7,000  
 With a minimum of 2 years commercial systems experience on any mainframe you will be involved in developing new on-line systems. Opportunity of project leadership.

### SENIOR SYSTEMS ANALYSTS

**WALTON-ON-THAMES** To £6,600  
 As a result of recent experience there are vacancies for applicants with at least three years systems experience. You will be involved in the development of new distribution and stock control systems in this large computer centre. Database and previous programming experience an advantage.

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 For those at all levels are required to provide detailed programs for various applications. Financial experience and knowledge of COBOL essential.

### ANALYST PROGRAMMERS

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 4- and 2 years programming experience on any mainframe, using COBOL is required for this position. A programmer working in more than one area will be involved in development and maintenance work. Progression to supervisor of programming team possible.

Please telephone for details and an application form for those and other vacancies.

## AMES PERSONNEL

Employment Agency Suite 14, Dryden Chambers, 119 Oxford Street, London W1R 1PA Tel: 01-434 1106

Metro, The West Yorkshire Passenger Transport Executive

### SYSTEMS OFFICER

(REF: PHO 3/3)  
 Salary Range £4,910-£5,491 (award pending)  
 plus car user allowance

Applications are invited only from persons with relevant experience for the post of Systems Officer based at our Headquarters in Wakefield, due to the current post holder securing promotion within the Executive. The main duties of the appointee will be to develop and manage the operational aspects of our route costing system, to co-ordinate and develop the implementation of management information and to develop computer bus and crew scheduling and rostering, together with ancillary operational aspects of computer use such as timetable preparation. Experience in computer scheduling developments and applications is highly desirable together with an appreciation of the workings of management information systems and the importance, role and basis of route costing.

Application forms are available from the Personnel Manager, WYPTE, Metro House, West Parade, Wakefield, WF1 1NS (Tel. 0824 78234 Ext. 284), to be returned no later than 17th November, 1978.



## Experienced Programmer

Up to £10,000 tax-free Saudi Arabia

Our client is a successful computer services company in Riyadh. They now require a Programmer with 2 to 3 years programming experience on Hewlett-Packard computers using COBOL, BASIC, IMAGE and QUERY on inventory and accounting applications. In addition to a salary of up to £10,000, tax-free, all expenses will be met by the client. Please send your CV to the address below. Letters will be forwarded direct, unopened, to our client. Any companies to whom you do not wish your application to be sent should be stated in a covering letter. Interviews will be held by the client in mid-November, so all letters will be replied to promptly. Ref. AH 56, Brunning Recruitment Advertising, Cedars Road, Maidenhead, Berks., SL6 1RZ

## Brunning Recruitment Advertising

Cedars Road Maidenhead Berks SL6 1RZ

### CLASSIFIED COPY

All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday. Ring Ian Carter for further details on 01-261 8016

## New ICL 2970 Installation Operations

One of London's largest Boroughs is in the process of installing an ICL 2970, 2 megabyte computer. Vacancies now exist for Operations/Control staff to join our team. We run a two shift system, five people per shift. Each shift will be responsible for On-line Operations and Data Control.

### Senior Operators

Ref. C/8/8762 to £5130 inc. S/A  
 With at least three years' experience on a large multi-programming machine, one year of which has been in a supervisory position. Duties will include training, working to a determined schedule, diagnosing hardware and software faults, liaising with engineering and user personnel and being fully conversant with On-line Operations.

### Senior Controllers

Ref. C/8/8763 to £5130 inc. S/A  
 With suitable experience of Data Control in a large machine environment, preferably including On-line Operating. Duties will include: being responsible for controlling all input data associated with processing, assembling and debatching data in accordance with pre-determined schedules, liaising with users, training all staff under him/her and being fully conversant with On-line Operations.

### Operator/Controllers

Ref. C/8/8764 up to £4150 inc. S/A  
 With at least one year's experience in a large multi-programming environment, either On-line or Off-line Operating. The successful applicant will carry out duties both On-line and Off-line using some of the most up-to-date equipment in a large go ahead installation. We offer the usual excellent public service conditions, including 20 days holiday, a restaurant and good sports and social facilities. If you are an ambitious person keen to develop your technical and personal skills, telephone 01-701 2870 anytime for an application form or write to: THE PERSONNEL OFFICER, London Borough of Southwark, 27 Peckham Road, London SE6 6UB. Quoting reference and job code. Closing Date 16 November 1978.

**Southwark**



**Commercial Analyst****(Company Car)**

We have a vacancy in our head office in Cardiff for an experienced Commercial Analyst to assist in the development of systems on a new mini computer which has yet to be selected and to assist with the implementation of Bass Charrington's group systems.

Applicants should be educated to degree level and should have at least 5 years' data processing experience, preferably in a financial environment. A practical knowledge of management information systems is essential.

The position will involve some travelling to locations in Wales and the south west of England.

There are excellent opportunities for career development within the Bass Charrington group.

We offer a competitive salary, Company car, contributory Pension and Life Assurance Scheme, plus other benefits associated with a major company.

**Computer Operations Manager**

We wish to appoint an In-House Computer Manager at our head office in Cardiff, to run a new mini-computer installation which has yet to be selected.

Applicants should have a minimum of 5 'O' Levels including Mathematics and English Language and at least 5 years' experience in a large data processing department. The successful applicant will probably be currently employed as a Shift Leader and seeking an opportunity to move into management.

There are excellent opportunities for career development within the Bass Charrington group.

We offer a competitive salary, contributory Pension and Life Assurance Scheme and other benefits associated with a major national company.

Applications in writing, stating age, experience and present salary to:

J. W. McCullough,  
Personnel Manager,  
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Maes-y-Coed Road,  
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If you are thinking of doing contract work why not start here by registering now for immediate and forthcoming requirements.

For further details contact Bridget Kotchie.

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Areas Preferred: First Choice \_\_\_\_\_ Second Choice \_\_\_\_\_

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**RPG 11**

Burton-on-Trent, Chatham, Chesham, City, Harmondsworth, Crawley, E.C.2, E.C.3, Greenford, Hendon, Ipswich, Kingston, Wembley, W.1.

**Analysis**

Also vacancies for BASIC, FORTRAN, NEAT 3, PLAN, etc. Borehamwood, Colchester, Colnbrook, Crawley, Dagenham, E.C.1, E.C.3, E.C.4, Harrow, Ipswich, Kingston, Manchester, Romford, S.W.1, Sutton, Tottenham, Whyteleafe, Witham, W.1, W.C.2.

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We need a person to share in the running of a busy, growing bureau with:

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A good salary circa £4,500 including annual bonus plus other benefits as available to the right person, together with relocation expenses.

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**Computer Operator  
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The Information and Computing Sciences Division of Shell Research Limited, Sittingbourne plays an increasingly important role in support of the search for new agricultural chemicals. To fulfil that role, the Division is looking for a Computer Operator to join a small group operating the Company's Univac 9300 and DEC PDP-11/40 computers on a shift basis. In addition the opportunity exists for programming for which you will receive training. Preferably you should have some experience with computers but if you have a mathematical/statistical 'bent', can show initiative, and work with a minimum of supervision we are willing to consider you. It is anticipated that current studies into computing on site will result in substantial new computing capacity.

We offer a competitive salary, membership of the Shell Contributory Pension Fund, as well as the opportunity to make use of a good staff restaurant and sporting facilities including squash courts and indoor swimming pool. Please write in detail concerning your technical ability and experience, or telephone for an application form to:

Mrs. M. J. Hunt, Personnel Division, Shell Research Limited, Sittingbourne Research Centre (c6), Sittingbourne, Kent ME9 8AG. Telephone: Sittingbourne 24444, extension 203.

**Move into  
D.P. Training**

3M, a major international organisation, wish to recruit a Training Officer to expand its Data Processing training function.

You will report to the Manager, D.P. Education and Training, and will be involved in the full range of training activities. This position offers an opportunity to devise and implement training modules and to assist in all aspects of D.P. staff development — with subsequent real opportunity to progress into other fields of D.P.

Aged 21+, you should, ideally, be of graduate level, with at least 2 years' experience in

systems analysis and programming and should have knowledge of a range of languages. Some experience of instruction would be an advantage, although full training in instructional techniques and D.P. training co-ordination will be provided if required.

The company offers a competitive salary and excellent large company employee benefits.

Please write with brief personal and career details to: Miss D. Archer, Personnel Officer, 3M United Kingdom Limited, 3M House, P.O. Box 1, Bracknell, Berkshire RG12 1JJ.

**INSTITUTE OF GEOLOGICAL SCIENCES****DATA ANALYST**

The Institute has a vacancy for a Data Analyst in its Geomagnetic Unit in Edinburgh. Duties will involve the processing of machine-readable, analogue and numerical geomagnetic data from regional arrays, surveys and the global network of permanent observatories; assisting in archiving and retrieving these data and in analysis and interpretation; and the development of computer programmes.

**QUALIFICATIONS AND AGE**

Applicants should normally be under 30 and have a degree or equivalent, preferably in Computer Science. A knowledge of Fortran and experience in handling machine-readable data would be an advantage. Appointment will be at Scientific Officer or Higher Scientific Officer level depending on qualifications and experience.

**SALARY**

Scientific Officer £2839-£4415  
Higher Scientific Officer £4101-£5448

Starting salaries may be above the minimum. Non-contributory pension scheme. The staff of Council are not Civil Servants but their pay and conditions of service are similar to those of scientists in the Civil Service.

For an application form, to be returned by 20th November 1978, write to Recruitment Section, Institute of Geological Sciences, Exhibition Road, London SW7 2DE.

Please quote reference SQ/GM/78/1.

NATURAL ENVIRONMENT RESEARCH COUNCIL

**City of Salford  
COMPUTER CENTRE****CHIEF SYSTEMS/PROGRAMMER**

Grade P.O.2 £6060-£6702 p.a. including supplement

The Computer Centre provides data processing services to all departments of the City Council using an ICL 1900 series computer. A vacancy has arisen in this key position in the Systems Development Division.

The Chief Systems Programmer reports to the Systems Development Manager and is responsible for the supervision, co-ordination and quality of work performed by a section of 10 people who comprise the Systems Design and Programming Section and for the supervision of a section of four systems analysts. The systems design and programming section produces computer systems from specifications of requirements provided by systems analysts, undertakes improvements to existing systems and provides software support for the Computer Operations Division. The duties of the post include participation in the management of the systems development division and in the forward planning of data processing activity.

Applicants must possess a sound knowledge of ICL 1900 series software; a demonstrable management ability and sound experience in systems design and programming techniques and methods. Knowledge of TP processing requirements and more recently available ICL equipment than the 1900 series would be a distinct advantage.

Post Reference: 1822/CW.  
This post is permanent, supernumerary and subject to the satisfactory completion of a medical questionnaire. Commencing salary will reflect experience and qualifications. Please write to: telephone 01793 3185 for an application form quoting post reference number to the Personnel Manager, Salford City Centre, Salford M27 2BN, to whom they should be returned by 17th November 1978.

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Plan.....		Systems analyst.....
Assembler.....		Systems engineer.....
PL/1.....		Analyst/programmer.....
Fortran.....		Systems programmer.....
Filetab.....		Programmer.....
RPG 11.....		Operations supervisor.....
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Others (specify).....		Consultant.....
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\*Delete where inapplicable

**Position sought** Please state briefly the type of appointment you are seeking.

Minimum salary £ \_\_\_\_\_ Notice required/Date available \_\_\_\_\_

Signed \_\_\_\_\_ Date \_\_\_\_\_

Cut out the whole advertisement and post to the address below.



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## Lothian REGIONAL COUNCIL

### NAPIER COLLEGE OF COMMERCE AND TECHNOLOGY COMPUTER UNIT

Napier College has a major commitment to education in computing and data processing and a separate Computer Unit to provide a service to students and staff has been created. The unit is split between the two major sites of the College. At Merchiston the unit operates a CTL Modular One Computer and at Symington an ICL 1902 Computer and staff may be required to work at either site.

Applications are invited for the following newly created vacancies:

#### 1. CHIEF PROGRAMMER/ ANALYST

The person to be appointed will be responsible to the Director of the Unit for:

- the implementation and maintenance of operating software
- the analysis and programming duties associated with the development of applications programmes.

This is a senior position and preference may be given to a candidate with a commercial background in Computing. In the absence of the Director the Chief Programmer/Analyst will assume responsibility for the Unit.

Salary is in accordance with Scale AP IV/V.

#### 2. COMPUTER OPERATIONS SUPERVISOR

It is anticipated that the successful candidate will have had a minimum of three years' responsible experience of both batch and interactive modes of computing.

The Computer Operations Supervisor will be responsible to the Director of the unit for all operating staff and the daily operating schedule for the installations.

Salary is in accordance with Scale AP III/IV.

#### 3. SENIOR PROGRAMMER

An experienced programmer is required with a knowledge of Systems Software implementation and applications program development. Preference may be given to candidates with experience of ICL or CTL computers.

The person appointed will be responsible to the Chief Programmer.

Salary is in accordance with Scale AP III.

#### 4. SENIOR COMPUTER OPERATORS

Two experienced operators are required, one for each of the unit's two Computers.

The person appointed will be responsible to the Computer Operations Supervisor for the day-to-day operations including supervision of operating and data preparation.

Experience in operating using batch and interactive modes or with ICL packages is desirable.

Salary is in accordance with the Scale for Higher Clerical Grade.

The following Salary Scales are applicable:

AP III	£4368 - £4773
AP IV	£4920 - £5404
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Higher Clerical	£3279 - £3561

#### APPLICATION FORMS FROM

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### Contract Programmers/Analysts

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Training given in on-line techniques and system design to programmers with key entry ability. Friendly office with free food and flexible hours in entertainment and shopping area.

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## COMPUTER RECRUITMENT DIVISION

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A prestige City institution offers challenging career prospects in a dynamic environment. For its senior level hours and a subsidised canteen.

**MINI SPECIALIST 3 £3500-£7000**

If you are a Mini Programmer in Civil or Commercial applications with experience of Mini-Assembler, BASIC, FORTRAN or CORAL 68 then call for details.

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Outstanding career prospects for Programmers with one year's experience in London, Surrey, Herts and Essex. Opportunities include training in DATABASE and COBOL.

**RPG II PROGRAMMERS £4500-£5750**

A fantastic opportunity in a world wide financial concern requiring IBM RPG II and a CHEAP MORTGAGE.

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Undoubted potential in the Systems and Programming environment offering a fast moving career to the right people.

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Recruitment Consultants with a background in the fast moving graduate to the right people.

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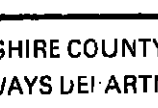
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**01-353 6931**

**STAFFS**

**HERTFORDSHIRE COUNTY COUNCIL**

**HIGHWAYS DEPARTMENT**



### ANALYST/PROGRAMMER

SALARY £5,847 to £8,822

GRADE PO1 (D/E)  
POST NO. AE12

#### THE JOB

We offer you the opportunity to support and develop a variety of information systems providing essential data for the engineers and management of the Highways Department.

You will join a small team under the direction of a Senior Analyst and participate in the design and implementation of new systems and the support of existing ones.

Applications which the team are presently responsible for are Traffic Accident Analysis, Traffic Counter Analysis, Structural Assessment, Road Inventory and Road Treatment records.

The present County Council computer is being replaced by the latest NCR Criteria Mainframe, a 1M byte 8800 with large discs, fast tapes and terminals. The new computer will offer virtual storage and interactive programming facilities. The team also use a database package accessed via terminals at a time sharing bureau.

#### THE PERSON

You should have a degree in Civil Engineering Mathematics or Computer Science and experience in technical or information systems work, with a background of COBOL and FORTRAN.

#### THE OFFICES

You will be working with a group of young people in a large country mansion within its own grounds.

For further information and application forms please telephone Hertford 64242, extension 8023 or write to Alison Taylor, Gradings, North Road, Hertford.

Closing date 20th November, 1978.

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**IBM 370/158 OSVS VICTORIA £4,200 +**

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**ICL 2903 EXEC I ILFORD £3,800**

**IBM 360/50 DOS GRASP WEST END £3,800**

**IBM 370/125 DOSVS POWER VS NORTH LONDON £3,590**

**IBM 360/148 DOS VS STRATFORD £3,500 +**

Ring: CAROLINE  
ON 638 9841 NOW!!  
80 Bishopsgate, EC2

### OPERATORS

**IBM 360/40: TWO OPERATORS £4000 +**

You need not have experience in IBM 360/40 for this international major Co. UK based, based on the installation of a new shift system and offers perks including subsidised canteen, sports and social facilities and cheap cars.

**ICL 1900 OPERATORS: GUI to £4500**

Just 1 visit a year needed for this. First of its kind, and perks inc. a subsidised canteen, sports facilities and an annual bonus.

**IBM 370/158: TWO OPERATORS £4500 +**

A minimum of 18 months' experience with OS/VS needed for this. Very good job. The Company operates a 7 day, 12 hour shift with full time off. Outstanding prospects, pension and life assurance scheme, and a sports and social club.

**NGR CENTURY OPS: READY FOR CRITERION? £4500 +**

12 hrs evening shift, 12 hrs day shift, 12 hrs night shift, and a free home after the late shift. These perks, together with the chance to train in a new shift system, are offered by the Holloway Co. You'll need a minimum 18 months' shift experience.

**PDP 11/70 OPERATOR £4100**

You'll be working on a two shift system totalling 34 hours a week near Farnborough. A minimum of one year's experience is needed. Free canteen, four weeks' holiday, school leaver and a sports and social club, and a free trip to progress.

**HONEYWELL 60/66 or H1200 OPS £4000**

As long as you have good GDS experience, you'll be ideal for this. Holloway Co. As the present, they're running a 11/70, but an H1200 is soon to be installed. Prospects, second to none, and a free home.

## ata Computer Recruitment

A division of ATA Selection and Management Services, recruitment consultants to industry and Commerce since 1962

### OPERATIONS SUPERVISOR

TO £4,000

### OPERATOR

TO £3,000

### CENTRAL EDINBURGH

Our client, a leading legal partnership, wish to recruit an Operations Supervisor and an Operator for their Philips P410 installation in Central Edinburgh.

The Operations Supervisor will work normal office hours and perform a dual role as Senior Operator/Supervisor. The ideal applicant will have experience in operating small business computers, VDU's although some experience will be given to anyone with experience of operating larger systems.

The Operator will work flex time and again preference will be given to applicants with experience of small business computers, VDU's, however, candidates with relevant operating experience will also be considered.

The salaries are negotiable around £4,000 and £3,000 respectively and carry the normal fringe benefits.

For an immediate interview telephone Ross McDermid

031-226 5381, ATA COMPUTER RECRUITMENT  
ANGIA HOUSE, 26 FREDERICK STREET, EDINBURGH EH2 2JR

### AMERICAN EXPRESS INTERNATIONAL BANKING GROUP

#### SYSTEMS DEVELOPMENT GROUP

### MINI-COMPUTER PROGRAMMERS

The U.K. Banking Group's Computer Systems Development Programme now requires mini-computer programmers to work on sophisticated real-time TP Systems. The Group is based at our Moorgate Offices using High Level Languages on Honeywell Level 6/7 Mini-Computers.

Previous experience on this machine is not necessary as training will be provided. We seek candidates who are of Senior programmer potential who would like to work in a small but expanding team.

Salary level: Circa £6,000. Plus all the fringe benefits normally associated with the International Bank.

Please apply in writing stating age and experience to:

A. J. Reynolds  
Deputy Personnel Manager, UK Region  
American Express I.B.C.  
c/o 120 Moorgate, London EC2P 2JY

### SOFTWARE DEVELOPMENT STAFF

Bucks / Holland

to £15,000 (Holland)

C. London

to £7,500

Owing to increased demand for staff, vacancies have arisen for Software Development Staff. Successful candidates will have had about 2 years' IBM assembler experience and some knowledge of DOS or PDS/VSE systems. Good prospects and a competitive salary package are offered. Please send your CV to: [Address]

### ANALYSTS

Markham and Wynn, with a minimum of 4 years' experience in D.P. with at least 1 year in systems analysis. In addition, Mini Analysts should have 2 years' experience in designing systems for Minis and some background in programming. CVs to: [Address]

### PROGRAMMERS

Paris

to £5,000

Successful candidates will find a technically challenging, pleasant and friendly working environment. All the benefits of a financial organisation. [Address]

### SYSTEMS ANALYSTS/PROGRAMMERS

Belgium

to £12,000

Successful candidates will find a technically challenging, pleasant and friendly working environment. All the benefits of a financial organisation. [Address]

### HARDWARE ENGINEERS

London East

to £11,000 TAX FREE

London, Europe, Middle East

to £8,000 (U.K.)

A number of interesting assignments with excellent opportunities have arisen for engineers with a broad experience of preferably multi-systems maintenance/development.

Preference will be shown to those with a degree or professional qualification. One year renewable contracts are available immediately with an excellent salary in the Middle East.

Informally has been retained by a variety of organisations in the Consultancy and Systems fields for recruitment of Systems Programmers for the above locations. Each company offers a salary, bonus and excellent fringe benefits. For those keen to know more, please contact [Address]

Interviews will be held in London as soon as possible and offers will be made to successful candidates as soon as possible. [Address]

### ANALYSTS/PROGRAMMERS

### Holland

to £14,000

Openings for all levels of D.P. professionals within this highly regarded technical consultancy specialising in on-line, real-time message switching and network applications using Minis and Microprocessors.

Assembler level programming experience is of primary importance and ideally candidates should have a degree in Computer Science or related areas.

Candidates will be expected to demonstrate enthusiasm towards the prospect of settling in Holland for an extended period. All removal expenses, initial accommodation, etc., will be met in full by our clients. Interviews will be held in London as soon as possible and offers will be made to successful applicants no later than end November.

Ref: 7/44

### INFORMATIX UNITED KINGDOM AND OVERSEAS INDEX

### Haven Informatix Limited

24 Grays Inn Road London WC1X 8HR Telephone 01-831 6055 Telex 299539 HAVEN G

*Signature*



# MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

## FUTURE DPM

CLOSE TO END OF M1 c £6,500  
2+ YEARS COBOL

This is an excellent opportunity for a person with a sound COBOL programming background who now feels capable of assuming full responsibility for formulating and developing new commercial systems and undertaking total charge of our client's installation.

The company, supported by a large American conglomerate, are well known and respected in the audio and computer peripheral sectors of industry. They have recently installed an ICL 2903 and now require an experienced programmer to implement a complete range of new systems.

The successful applicant, ideally with two or more years' programming experience in a financial environment, will be encouraged to develop an all round analytical and programming expertise and can look forward to promotion to DATA PROCESSING MANAGER where excellent opportunities are available.

The company offers four weeks' holiday, pension and life assurance schemes with a subsidised restaurant and excellent career prospects.

Ref. N2/211

24-hour answering service  
Please telephone for a confidential discussion or write to:  
30 Fleet Street, London EC4Y 1AA  
01-353 0981

## APL Analyst/Programmer

Rank Xerox (UK) are looking for an Analyst/Programmer - preferably with APL experience to join the Timesharing Applications unit within the O.R. Group situated at Bridge House, Uxbridge.

The work involves development of major APL applications and providing full support to internal users.

We are interested in meeting people with either APL experience or with some Fortran or equivalent scientific programming experience backed up by proven mathematical ability and good communication skills, in view of the amount of internal liaison involved.

Salary level will vary according to age and experience but will be competitive and offered in conjunction with an attractive range of benefits and exceptional career prospects within a highly successful international organisation.

For further details please contact Denise Lincoln, Rank Xerox (UK) Ltd, Bridge House, Oxford Road, Uxbridge, Middlesex.  
Telephone: Uxbridge 51133.

RANK XEROX

**UNIVAC 1100**  
UNIVAC 1100  
NCR 5350  
IBM OS  
IMS  
ICL 1900 QII  
DEC PDP 11/40  
FILE TAB EXPERIENCE

**ASSEMBLER PROGRAMMERS**  
COBOL PROGRAMMERS  
COBOL PROGRAMMERS  
COBOL PROGRAMMERS  
SYSTEMS ANALYSTS  
COBOL PROGRAMMERS  
DEC BASIC PLUS OR

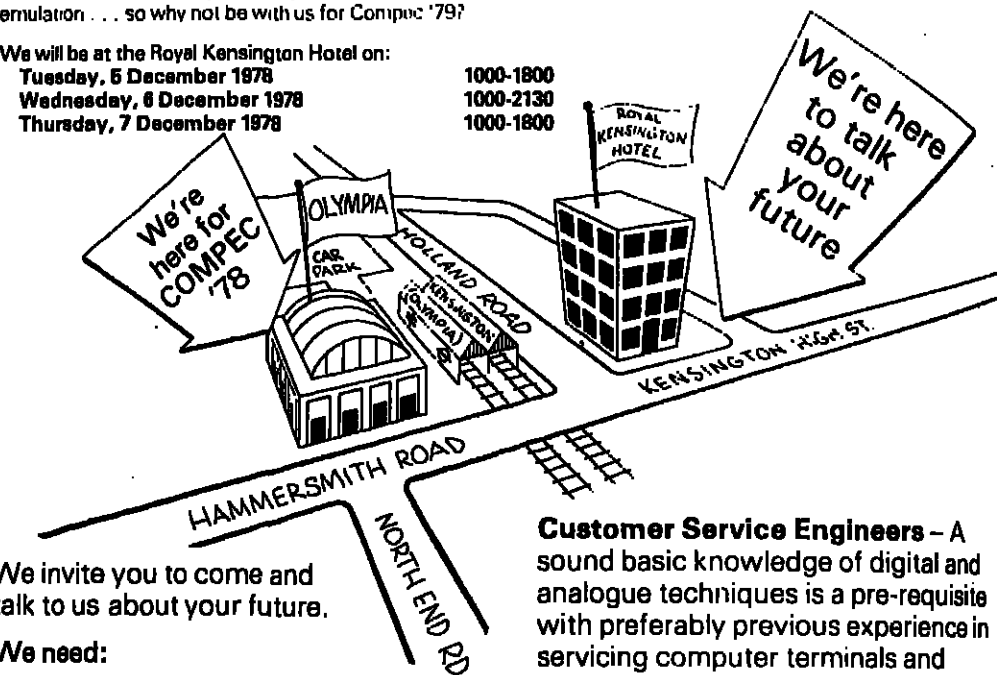
Telephone of candidate to:  
MSM COMPUTER SERVICES, FREEPOST, WIRRAL, MERSEYSIDE L83 3AS. TEL. NO.  
051-408 6345

# Join us for Compec '79

If you're going to Compec this year, you will see that Tektronix is firmly in the forefront of the expanding graphics terminal market, associated computer peripherals and microprocessor emulation... so why not be with us for Compec '79?

We will be at the Royal Kensington Hotel on:  
Tuesday, 5 December 1978  
Wednesday, 6 December 1978  
Thursday, 7 December 1978

1000-1800  
1000-2130  
1000-1800



We invite you to come and talk to us about your future.

We need:

**Sales Executives** - 3-4 years' experience preferably in computer sales and a degree in engineering, mathematics or computer sciences.

**Product Support Engineers** - Communicative engineers with a degree/HNC in electronic engineering, familiar with digital/analogue techniques and design experience in data communications.

**Systems Analysts** - At least five years' post-graduate experience on a wide variety of main-frames, operating systems or communication software, your analytical, incisive mind and an interest in varied customer problems is what we're looking for.

**Customer Service Engineers** - A sound basic knowledge of digital and analogue techniques is a pre-requisite with preferably previous experience in servicing computer terminals and peripherals on site.

**We offer:** Above average salaries, non-contributory pension and life assurance scheme, and other big company benefits. We also, of course, ensure that all the necessary sales or product training is given at our well-equipped training centre in Amsterdam.

Don't forget - the Royal Kensington Hotel, Tuesday, Wednesday, Thursday, 5-7 December, all day. But if you can't make it, write to or phone Jim Rockall at Tektronix UK Ltd, Coldharbour Lane, Harpenden, Herts (Harpenden 63141) for an application form and information package.

## Tektronix

COMMITTED TO EXCELLENCE

UNIVERSITY OF  
NEWCASTLE-UPON-TYNE  
NORTHUMBRIA  
UNIVERSITY MULTIPLE  
ACCESS COMPUTER

### PROGRAMMING ADVISER

Applications are invited from graduates to join one of the groups within the WU/MAC computing service concerned with advising, teaching and providing documentation on the use of computer programs. Users of the service come from many different universities and cover a wide range of academic disciplines. The areas where expertise is required are: graphics, scientific applications and survey and statistical analysis. Applicants should have an understanding and sympathy with both research workers and students, and a desire to extend the knowledge and use of computers. The Computing Laboratory has excellent facilities including powerful IBM hardware with intensive capability and a large repertoire of library programs.

The appointment will be made on one of the following scales according to age, qualifications and experience: Range 1A £2,893-£8,556 per annum. Range 11 £3,085-£7,754 per annum. Membership of the appropriate University superannuation scheme will be required.

Further particulars may be obtained from the Registrar, The University of Newcastle, Newcastle-upon-Tyne NE1 7RU, with whom applications (three copies), together with the names and addresses of three referees, should be lodged not later than 15th November 1978. Please quote reference CV.

## Freelance Programmers

Our client has IBM 370 Mainframes and will pay attractive rates for programmers with a minimum of four years' programming experience, at least a year of which is on IBM 360/370 equipment using COBOL under DOS or DOS/VS.

If you have the relevant experience and would be interested in a long term contract in the Northern Home Counties area then contact us.

Please write with full details. These will be forwarded direct to our client. List separately any companies to whom your application should not be sent. Ref. FY.1077.

These appointments are open to men and women.

**AGL CONFIDENTIAL RECRUITMENT**  
A member of MSL Group International

# MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

## CAREER PROGRESSION PROGRAMMERS & ANALYST/PROGRAMMERS

BEDS. c £5,500

The decision to change environment, whether in a new job or new location, is not one to be taken lightly. Assurance of an exciting and technically stimulating challenge can often alleviate doubts and confirm your future plans. Our client, a division of a major British company, can offer these incentives due to their commitment to embark on a complete range of commercial systems. In order to support these plans, the company is now looking to recruit additional professionals to become actively involved at the initial stages of projects and see them through to successful implementation.

Career minded PROGRAMMERS and ANALYST/PROGRAMMERS, who possess a minimum one year's experience in either COBOL or ASSEMBLER and who are familiar with IBM 370 utilities, can look forward to an outstanding career path. Apart from attractive salaries and prospects, the company also offer very favourable relocation expenses and other fringe benefits.

Ref. N1/211

## PROGRAMMERS

SLOUGH To £5,000

Our client, a busy engineering company, is currently developing several on-line real-time applications.

If you would like:

- ★ To receive training in advanced IBM software.
- ★ Develop COBOL programs involving database and TP systems.
- ★ Work on a variety of applications projects.
- ★ Five weeks' holiday a year.
- ★ Excellent starting salary and conditions of employment.
- ★ To join an active sports and social club.

—and you have a minimum of 12 months' COBOL programming experience, then this could be a good opportunity to accelerate your career.

Ref. E1/211

## ANALYSTS & PROGRAMMERS

CROYDON £7,000-£10,000

If your current position can offer you development work in challenging areas of computerisation: excellent job prospects; together with a salary in the band quoted above you will probably not need to read further.

If however you do not have, but would like, this type of package you need to know more about the jobs on offer at our client's offices in Croydon.

We are recruiting both Analysts and Programmers for projects commencing in the early part of the New Year. Applicants should have a good general D.P. background and the potential to progress in a demanding environment.

The computer department is housed in modern offices in Central Croydon easily commutable for Kent, Sussex and S.E. London.

Ref. SE1/211

## SENIOR ANALYSTS CICS/IMS SYSTEMS

THE CITY To £7,500 + BENEFITS

Senior personnel are required to define systems for a large IBM installation utilising both IMS and CICS. Projects cover a wide variety of applications and the company can boast of a very successful record in activities typical of the City. Candidates should have at least two years' proven analysis experience with particular emphasis on a methodical approach to system/program specifications and testing procedures. The more senior applicants will possess on-line or database experience coupled with a programming background.

Career opportunities are excellent as the data processing department is seeking to expand the hardware configuration to keep pace with the demand for D.P. systems. First-class starting salaries are further enhanced by an annual bonus and modern working conditions.

Ref. S1/211

24-hour answering service  
Please telephone for a confidential discussion or write to:  
30 Fleet Street London EC4Y 1AA  
01-353 0981

## ata Computer Recruitment

A division of ATA Selection and Management Services, recruitment consultants to industry and commerce since 1962.

## ANALYST PROGRAMMER

c£5,600 + Generous Expenses  
CHESHIRE

Our clients require an Analyst Programmer with approximately three years' experience of the analysis of business problems and providing a computer based solution.

He/she will be actively employed in Management Control Information Systems and in-depth knowledge of IBM Systems, particularly S32, and RPG II are essential. The successful applicant's first assignment will be to identify requirements, specify systems, write program specifications and be responsible for the installation of a S32 at a subsidiary company and the subsequent user training.

Thereafter, he/she will operate within the group in a "consultancy role" specifying systems and/or Hardware.

As a direct result of the nature of our client's activities, there will be a high level of travel within the UK to the various offices and to subsidiary companies. It is also probable that the occasional visits to associate companies on the Continent will be necessary.

Salary increases consist of two elements, a cost of living increase and a merit reward which is directly related to the degree of effort and success achieved by the individual.

GENEROUS RE-LOCATION ASSISTANCE IS AVAILABLE consisting of Estate Agent's fees, all legal fees and physical removal costs.

For further details telephone 061-832 5856 or write enclosing curriculum vitae to:

**ATA COMPUTER RECRUITMENT**  
ANGLIA HOUSE, 86 CROSS STREET, MANCHESTER  
M2 4LA

LONDON (01) 637 0781 MANCHESTER (061) 832 5856 BIRMINGHAM (021) 643 1994  
BRISTOL (0272) 211035 EDINBURGH (031) 226 5381 CRAWLEY (0293) 514071

CHARING CROSS  
HOSPITAL MEDICAL  
SCHOOL  
(University of London)

### MACHINE OPERATOR

required to work in Computer Unit.

Duties will include data preparation and assisting with computer operation.

All necessary training will be given.

Good social and recreation facilities on site.

Salary according to age and experience on scale £1,881-£2,619 plus £450 per annum London Allowance.

Applications on forms obtainable from The Secretary, Charing Cross Hospital Medical School, The Raynolds Building, St. Dunstan's Road, London W8 8RP. (Ref. 424/6).

UNIVERSITY OF BUREY  
COMPUTING UNIT

### SENIOR COMPUTER OPERATOR

(Deputy Shift Leader)  
Up To £4,200

FOUR WEEKS' LEAVE

We need a Computer Operator who has had at least two years' experience and is now looking for a position with greater responsibility and wider variety. Actual experience on specific computers is less important than the personal qualities of adaptability and initiative. We already have several different computers, and new machines are expected to be commissioned next year.

There are three shifts from Monday to Friday. Excellent sports and social facilities. Very pleasant surroundings in University campus.

For further details, or to arrange an informal visit to the Computing Unit, please telephone Mr. R. E. Stroudley (Operational Controller) on Guildford 71201, ext. 757.

For an application form, write to the Shift Officer, University of Surrey, Guildford, Surrey GU2 6XH; telephone Guildford 71201, ext. 454.

West Yorkshire Metropolitan County Council  
Traffic Unit

### Section Engineer

— Post Ref. TF78 017

PD1A £5,727-£6,342 inclusive of supplement

To lead a small team undertaking the planning, design and implementation of various parts of the UTC signal network in the county, initially primarily in Bradford, and such other traffic signal work as is necessary. The post is based in Leeds.

Sound background in traffic engineering essential, particularly in the field of Control Systems and Traffic Signals, together with experience in Transit. Professional qualification in relevant discipline required.

Application forms may be obtained from Directorate of Planning, Engineering and Transportation, Room 238, County Hall, Wakefield and should be returned not later than 13th November, 1978.

## SYSTEMS PROGRAMMER

£7,600 p.a.

You should have a good background in DOS/VS, have worked with operating systems for at least 18 months, and preferably you will have knowledge of ASSEMBLER, CICS, GRASP and/or POWER. Experience of TP/Database systems would also be advantageous, though not essential.

This is an opportunity to join a small yet progressive organisation. You should be prepared to travel to client locations around London or beyond. A mileage allowance will be paid, and any other travel costs reimbursed.

Applications will be treated in the strictest confidence.

In the first instance apply to Barrie Holland, X-Calibur, 47 Essex Street, WC2R 3JF. Telephone 01-353 8201. Please quote reference No. 320.

Computing Services Association  
Agency Licence SEA/324B  
**X-Calibur**  
CONTACT SERVICES







# "For crying out loud,

can't anyone design a system properly?"

If you've ever felt that strongly about the systems you're obliged to work with, you could be the man or woman for us.

If you're sick of living with other people's sloppy software design, we can offer more than just an end to your frustration.

If you're convinced that with your guidance things could be done better, and you're itching for the opportunity to prove it, we'll give you that opportunity - and the challenge, responsibility, money and prospects that rightfully go with it.

Don't imagine that we're talking about a conventional programming or analysis job. No, we're talking about a software job that very few companies recognise the need for (which is why your job gives you so many headaches).

We're talking about software quality engineering.

It's an issue that we take very seriously indeed, for good reasons. Our business is to produce strategically important,

airborne radar systems that are built around real-time computers. So corrupt data or a faulty response can have drastic consequences.

That's why we need men or women to apply the strictest quality standards to our software and its generation. The standards and quality procedures are already set; your task would be to apply them rigorously. To identify problem areas. To put people right where they've gone wrong, as tactfully as possible. In short, to provide the promptings that individual consciences don't always provide.

An unusual job, certainly. An interesting and worthwhile job, definitely. And, in a new discipline in a growing department in a highly successful company, a job with a future.

To find out more, write to the man who knows all about it - Geoff Parry, our Software Quality Manager. Better still, phone him direct on 01-953 2030 ext. 3791. Alternatively, write to H. E. Batchelder, Marconi

Avionics Limited,  
Elstree Way,  
Borehamwood, Herts.  
Quote ref. MA 78112.

**MARCONI  
AVIONICS**

A GEC-Marconi Electronics Company

## Programmers c. £5,500 p.a.

Bring your experience to Kimberly-Clark in Maidstone, and share in our success.

Kimberly-Clark is a successful international organisation manufacturing such brand-leading paper products as Kleenex Tissues and Hi-Dri.

We require experienced Programmers to join a progressive installation engaged in developing interesting applications which include on-line systems and the use of data-base technology.

The required qualification is sound experience in a commercial programming environment, probably gained from at least two years in

programming. The installation is based on an IBM 370/148 computer which is due to replace the existing IBM 360/40 computer in December.

Initial salary will be up to £5,500 according to experience, together with other fringe benefits including BUPA and relocation expenses where necessary.

So if you're looking for a better job, that offers a great future, then make the move to Kimberly-Clark and share in our success.

Please write or telephone JANE BARTROP, KIMBERLY-CLARK LTD., Larkfield, Near Maidstone, Kent. Tel: Maidstone (0622) 77700.



Kimberly-Clark Limited, Makers of Kleenex Tissues

Norfolk

## Systems Analyst

We are a privately-owned leading provincial newspaper group. Our modern Head Office is situated in the heart of Norwich, an exceptionally pleasant-looking city, close to the Norfolk Broads and within 30 minutes of a variety of resorts with golden beaches.

We currently use twin Univac 9480's with communications equipment to support our real-time advertising, accounts and text processing systems.

Candidates must have several years' experience including the successful design, implementation and support of at least one major system. Experience of Univac 9000 series machines, Assembler level programming and real-time or time-sharing systems would be an advantage.

We offer a competitive salary, good working conditions, four weeks annual holiday, a profit sharing scheme, pension and life assurance schemes, canteen and social club facilities and assistance with relocation expenses where applicable.

Application should be made in writing to:  
Personnel Officer,  
Eastern Counties Newspapers Ltd,  
Pressprint House, Rowan Road,  
Norwich, NR1 1RE  
Telephone (0603) 28311

## HOLLAND

Share System Programming Ltd. is a company that specialises in providing system programming support for IBM users. We are looking for experienced

## System Programmers

(£ 375 - £ 425) per week

who are keen to tackle interesting projects and try a different lifestyle.

We also have an immediate requirement for System Programmers with the following experience:

**CICS/VS, DOS/VS (and TOTAL or DL/I)** would be an advantage. **£380.00 per week.**

**IMS DB/DC** internals with **PL/I, BAL** and systems design experience to be part of a software development team - **£450.00 per week.**

If you would prefer to work as part of our permanent staff, instead of contract, we would be pleased to discuss a financial package of around £11,000 P.A. plus a company car.

Please write giving details of your career to: Mr. R. Vokes, or for after work hours enquiries, call Mr. J. Owens on 02507 6001, and reverse the charges.



Share System Programming Ltd.  
Etna 19, 1186 CM  
Amstelveen  
Holland  
Telephone: 010/3120/452022



**PROJECT MANAGEMENT CAN BE YOURS!** Sound technical background on IBM and self-motivation... then this highly successful group would like to discuss your future. As a senior position, your work includes development and design of client company benefits. **REF. 1823**

**DO YOU** want to join a young and enthusiastic team? If **YOU** have 18 months' R/GI experience apply **NOW**. Our client a major merchant bankers retains IBM system 3 hardware. They offer fantastic benefits including a subsidised mortgage and good promotional prospects. **REF. 1828**

**FANTASTIC** opportunity awaits a trainee with either a **DEGREE OR TRAINING**. Company offers full **PERFORMANCE** training. If you get into programming with a company at the forefront of technology, who retains IBM 370 hardware, **AMAZING** promotion prospects. **REF. 1901**

**IMPROVE YOUR CAREER** prospects. Do you find your present job dull and uninteresting? If you have around 12 months' DOS ASSEMBLER experience, then this prestige organisation, which provides technical services to its clients, can give you the career you've been seeking. **REF. 1905**

**NEW DEVELOPMENT** Newly installed mini computer seeks competent COROL FORTRAN analysts. Working in conjunction with designers, specifying and writing programs, and possibly supervising junior staff. Experience of forecasting, budgeting or forecasting, essential with knowledge of structural design and programming of T.P. an asset. **REF. 1902**

**EXCITING** opportunity for programmer with 12 months' COBOL experience to be trained in analysis. The company, a world leader in its technological field, has a large TP network with links to Europe and they offer full training in database and T.P. **FANTASTIC** prospects for **PROMOTION**. **REF. 1802**

**SUPERB** opportunity awaits a Systems Analyst with NEA 3 experience with promotion prospects. To D.P.M. within 12 months. Person will have full responsibility for the department during which time an upgrading of their hardware - Company offers EXCELLENT fringe benefits including **RELOCATION**. **REF. 1851**

**DECISION MAKER!** International organisation seeks live wire to lead small project team from planning through to implementation. If you have experience in systems analysis in an IBM OS COBOL environment and want to enlarge on your leadership responsibility then **JOIN NOW**. **REF. 1904**

For further details telephone our London Office 01-734 0152 (24 hours)

## CONTRACT DIVISION

### LONDON + HOME COUNTIES

IBM COBOL/ASSEMBLER DOS	HERTS	£200 p.w.
IMS COBOL OR ASS OS AN/PROG	KENT	£220 p.w.
DATAPoint 2200 EXP	CITY	£220 p.w.
PDP MACRO II RSX/II	C. LONDON	£200 p.w.
MINI ANALYST/PROG BASIC	N. LONDON	£220 p.w.
ANALYST T.P. EXP	E. LONDON	£230 p.w.
CORAL COMPILER PDP II EXP PREF	HERTS	£230 p.w.
TEAM LEADER BASIC COMPILER	HERTS	£250 p.w.
PDP MACRO II + CORAL PROG	HERTS	£230 p.w.
SYSTEMS PROG DOS VS CICS	CITY	£275 p.w.
HONEYWELL EASYCODER	CITY	£210 p.w.
IMS PL/I DB/DC	CITY	£240 p.w.
ICL 2903/1900 COBOL	SURREY/	
	MIDDX	£190 p.w.
IBM OS PL/I	W. COUNTRY	£210 p.w.
2980 VMEB D/BASE PREF	MIDDX	£250 p.w.

For details of the above and future contracts ring **CHRISTINE KAY** or **DAVE HAYTON**. Tel. 734-0152 (24 hours). 27 Noel Street, W.1. Offices Amsterdam, Paris, Manchester, Birmingham.

### OVERSEAS

<b>DUTCH SPEAKING PROGS</b>	<b>HOLLAND</b>	<b>£NEG p.w.</b>
IBM OS COBOL KN OF DUTCH	<b>BELGIUM</b>	<b>£375 p.w.</b>
SEN SYSTEMS PROG OS/DOS	<b>MUNICH</b>	<b>£NEG p.w.</b>
SYSTEMS PROG OS	<b>MUNICH</b>	<b>£NEG p.w.</b>
PDP FORTRAN KN OF FRENCH	<b>BRUSSELS</b>	<b>£375 p.w.</b>
IBM SERIES I ASSEMBLER	<b>HOLLAND</b>	<b>£375 p.w.</b>
PDP MACRO II RSX/II	<b>HOLLAND</b>	<b>£350 p.w.</b>
IBM OS COBOL SPSS	<b>HOLLAND</b>	<b>£350 p.w.</b>
IBM SYSTEMS PROG OS/DOS	<b>HOLLAND</b>	<b>£400 p.w.</b>
3780 EXP	<b>HOLLAND</b>	<b>£375 p.w.</b>

## KNIGHT PROGRAMMING SUPPORT LIMITED

27 NOEL STREET, LONDON, W.1. TELEPHONE 01-734 0152/8 (24 HOURS)

OFFICES: AMSTERDAM, PARIS, MANCHESTER, BIRMINGHAM





## SALES PERSONNEL

MAJOR SALARY INCREASES AVAILABLE  
FOR PROMOTED SALES

Superb opportunities have arisen due to planned and controlled growth patterns in the terminal and associated product areas, within a major Electronics Company.

We have been retained by our Clients, who have an enviable reputation, to identify sales personalities to operate in existing sales territories in London and the Home Counties, Scotland and the North East (preferably the candidate for the latter position will be located in the Edinburgh area).

Candidates for these positions should ideally have:

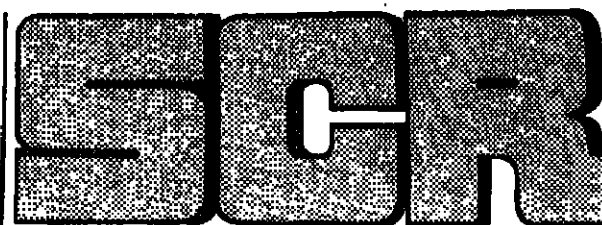
- \* An understanding of terminal products
- \* A qualification to Degree or HNC standard in a related subject
- \* A confident sales personality to accompany a strong record in selling
- \* Motivation and determination to succeed.

As may be expected from a major International Company, excellent terms and conditions including a relocation package are associated with these positions.

FOR FURTHER DETAILS CONTACT: Richard Champion on 021-236 3781 (24-hour answering service).

Ref. CW/11/1

## SPECIALIST COMPUTER RECRUITMENT LIMITED



**BIRMINGHAM 021-236 3781**  
Freeport, Equity and Law House,  
35-37 Great Charles Street Queensway, Birmingham B3 2BR

**MANCHESTER 061-833 0427**  
Freeport, Blackfriars House, The Paragon, Manchester M3 9BB

**LONDON 01-935 0671**  
Freeport 13, 3 Mandeville Place,  
Wigmore Street, London W1M 5LB

Computing  
Services  
Association

## Computer Programmer (Scientific Officer)

The Forestry Commission offers a period appointment of 3 years for a Computer Programmer at the Forest Research Station, Alice Holt Lodge, Farnham, Surrey.

**Subject:** The work is directed towards efficient processing of the data to be collected in a new additional Census of Woodlands and Hedgerows. It will involve close liaison with the statistician designing the sampling system and with the Census Officer in charge of the whole project and will include programming, system design, statistical calculation and computer terminal operation.

**Age and Qualifications:** Under 28 with an honours degree in mathematics or computer science plus some knowledge of statistics.

**Salary:** Within the range for Scientific Officer £2,839-£4,415 depending on qualifications and experience.

**Closing date for applications:** Application forms and further details can be obtained from Mr. A. J. Freeman, Forestry Commission, 231 Cornhill Road, Edinburgh EH12 7AT. Completed application forms should be returned not later than 23 November, 1978.

## UNIVERSITY OF SURREY COMPUTING UNIT

## SYSTEMS PROGRAMMER/ ANALYST

Systems Programmer/Analyst needed to exercise his/her initiative in a small team involved with design and improvement of systems using mainframes, minis and microcomputers. Projects may include packet switched networks and multi-processor and distributed processor configurations. We currently operate two ICL 1900 computers and a Prime system; replacement of the 1900 equipment is expected in the near future.

The salary scale will be up to £8555 per annum, with generous annual leave.

Applications, in the form of a curriculum vitae, and the names and addresses of two referees, should be sent to the Staff Officer, University of Surrey, Guildford, Surrey GU2 6XH, or telephone Guildford 71281, extension 470 for further information.

## SOUTHERN ELECTRICITY SENIOR PROGRAMMER FOR REAL TIME SYSTEMS

Southern Electricity is engaged in the design, development and implementation of a large Telecontrol System. This will have a central complex containing ICL 2950 and PDP 11/34 Computers linked to a distributed processing system using Microprocessors located at nineteen different sites throughout Southern England. An opportunity now exists for a Senior Programmer to join the Computer Applications team engaged on this exciting project.

Ideally the successful candidate will have appropriate computing qualifications and at least two years' experience of programming for Real Time Systems. A knowledge of PDP 11 Computers and/or Coral 66 would be advantageous. Training will be given where necessary.

The position is based at the Board's Head Office near Maidenhead.

**SALARY WITHIN THE RANGE £4,231 - £8,216 per annum.**

**Applications should be made on forms obtainable from The Secretary at Southern Electricity House, Littlewick Green, Maidenhead, and returned to him quoting 67/78 by not later than November 17, 1978.**

## UNIVERSITY OF BRISTOL

## Programmer

for S.C.R. Mini Computer

Joint Appointment in Faculty of  
Engineering/Computer Centre

The Science Research Council has recently installed a multi-user mini-computer at the University of Bristol. This computer is the first of a number of such machines which will form a national network providing advanced interactive computing facilities for engineering research.

A programmer/advisor is required from 1st January, 1979 or as soon after that date as possible, to assist various research groups in developing programs and to ensure that the advanced facilities available are utilised to the full. The successful candidate will be expected to become familiar with the facilities of the mini-computer which will be linked to the IBM 360 at the Rutherford Laboratory and the successful applicant will be expected to become familiar with the facilities of the mini-computer which will be linked to the IBM 360 at the Rutherford Laboratory and the successful applicant will be expected to become familiar with the facilities of the mini-computer which will be linked to the IBM 360 at the Rutherford Laboratory.

Applicants should have an honours degree in an appropriate subject (e.g. engineering, mathematics, computer science, physics). The salary scale for the appointment is Grade 1A on the Other Related Staff salary scales, £3,893-£5,555 per annum (salary scale is under review). The initial salary will be determined according to experience and qualifications and it is expected that the appointment will be made in the lower half of the scale.

Applications stating age, qualifications and experience and including the names of three referees should be sent not later than Friday, 24th November, 1978 to the Registrar and Secretary, Senate House, Tyndall Avenue, Bristol BS8 1TH (quoting reference JPB), from whom further particulars may be obtained.

## SYSTEMS ANALYSTS LECTURER £6,000-£7,750 CARDIFF/LONDON

A challenging opportunity for Systems Analysts who are seeking variety, good rewards and a role within an expanding organisation. The essential requirements are wide experience in their field with the ability to communicate clearly and succinctly.

Lecturing experience is not essential as there is a full training programme which includes the use of the latest technical teaching aids, eg. CCTV.

The appointments are with our client, a

well established computer services company whose dynamic ideas have built up a broad sphere of operations including a sophisticated education and training service to government, industry and commerce.

The package is good, up to £7,750 depending on age and experience, plus the usual benefits of a large company, such as lunchroom vouchers, pension scheme, etc.

To take action ring either number any.

**01-231 3459  
051-236 7711**

**Modern Marketing Limited**  
Albion House, Albert Embankment  
London SE1 7UB

## Systems Controller - Computer Operations

Expanding consumer services means developing new systems for management. At the Automobile Association we are involved in a wide variety of new projects - both long and short term; and meet growing needs, we are presently in the process of expanding our computer capability with the installation of ICL 2900 equipment.

Applications are now invited by the post for a SYSTEMS CONTROLLER within the Systems and Control Unit of the Computer Operations Department based at Head Office in Reading.

Duties involve checking all new and enhanced systems for adherence to standards; liaising with Management Services and user departments on technical and operational matters; and being responsible for the correct and efficient operation of the AA's computer services, including the security of each system, training of new personnel and providing forward plans. Applicants, male or female, should have good 'A' levels and at least 2 years' experience of ICL computing. The ability to communicate at all levels is essential.

Salary is from £5,000 p.a. according to qualifications and experience. Benefits are in keeping with a progressive organisation, and include a comprehensive relocation package if applicable.

Please write to Kathy Holloway, Personnel Department.

**AA**

## THE AUTOMOBILE ASSOCIATION

Fanum House,  
Basing View,  
Basingstoke, Hants.

## VICTORIA APPOINTMENTS LIMITED

## Shaw Carpets Limited

## BARNLEY - S. YORKS Programmer

This manufacturing company with a sophisticated D.P. organisation based on an IBM 370/148 is seeking a programmer with experience in DOS/VS using CICS for real-time and local teleprocessing systems requires an immediate internal promotion.

The successful candidate will ideally have 12 months' IBM ASSEMBLER experience, be prepared to relocate where suitable, and will join their enthusiastic team where Management Accounting systems.

The Company offers excellent terms and conditions of employment. Applications available where necessary.

For an application form in respect of this and hundreds of other vacancies, please write to Miss Val Halliwell, Victoria Appointments Limited, 24 Mosley Street, Manchester M2 3LS (24 Mosley Street) and 061-234 7417 or home 444 8111.

## Systems Analyst - well experienced

Widely experienced - up to £15,000

One of the most prestigious software companies in Europe is currently expanding their German operations in central Germany. Their business is based on a wide range of projects currently being developed on both Minis and Mainframes.

Due to this planned expansion, they want to meet several computer professionals who are competent in German. Technical background can be widespread but current priorities call for experience of System 370, 34, Nardorf, PDP 11, Nova, 2900, Siemens 330 and the internal of IBM DOS operating systems.

While our client can accommodate people seeking employment for a year or so, they definitely want candidates with medium to long term ideas about settling in Germany within the firm.

Ref. CW 44/1

## Technical Writer

Widely experienced - up to £15,000

Switzerland - up to £15,000 p.a.

We wish to recruit 2 experienced technical writers for permanent positions with our Swiss clients.

The successful candidates will join large project teams, working up to 30 man years communications systems. Each technical writer will report to his project manager. The main responsibilities will include working to tight time scales, on the preparation of documentation and literature on the implemented projects for user purposes.

Candidates must have a proven track record in technical writing, and be prepared to work on their own initiative, servicing the needs of the project development teams in a highly progressive company in the communications field.

Ref. CW 44/2

## Wave into Systems

Widely experienced - up to £15,000

Widely experienced - up to £15,000

A multi-million pound manufacturing organisation has an immediate need for SYSTEMS ANALYSTS to join them for the development of New Commercial Systems.

The Company, which is situated on the Hertfordshire/Middlesex border, has a large installation with Communication Networks running throughout the country.

We would like to hear from Programmers who would like an opportunity of moving into Analysis, or Analysts with 1-2 years' experience, who would like to be involved in the planned expansion with this go-ahead Company who offers excellent career paths.

Ref. CW 44/3

## Systems Analyst

Widely experienced - up to £15,000

A multi-million pound food group situated at Walton on Thames only half an hour from central London, have a need for Systems Analysts for their installation which will shortly upgrade their Dual 370/148 to a 3032 with the introduction of IMS Database under MVS.

We would like to hear from applicants who have had at least three years' Systems Analysis experience. Database and previous programming experience an advantage.

They can offer you the opportunity to be involved in a development of the Distribution and Packed Stock System for several depots and factories. Additional work includes significant enhancements to existing systems and developing applications for subsidiary companies.

Conditions of employment include Free Life Assurance, flexible working hours and relocation expenses where appropriate.

Ref. CW 44/2

## Systems Analyst

Widely experienced - up to £15,000

Widely experienced - up to £15,000

An International Company requires an experienced Systems Analyst for a new development. Good commercial systems experience in a DOS/VS environment would be ideal, but successful candidates must have completed at least one decent commercial system. A programming background in Cobol would also be a help.

A top class salary and conditions of employment will be offered to the right calibre of applicant. Career prospects are good and relocation expenses will be provided where necessary.

Write or telephone Gerald Delemere at Dublin 789577.

Ref. CW 44/5

## Small Business Systems

West London ASSEMBLER £4500-£8300

A major international Systems House who are better known for their mainframe work, have a fast expanding Small Business Systems Division.

They have an urgent need to recruit people who range from Programmers with 2-3 years' experience, through to Senior Project Leaders.

All you need is experience of ASSEMBLER on any machine, but if you have experience of SYSTEMS DESIGN, REAL-TIME ORDER ENTRY, or ORDER PROCESSING so much the better. Projects are all based on Real-Time APPLICATIONS on the ICL SYSTEM 10 and SINGER 1500 hardware.

Project teams usually consist of 2-3 people, allowing you to follow the project from specification through to implementation.

Salaries are well above market rate and the company can offer excellent career opportunities, Annual Bonus, plus usual Company Benefits one would expect from a company of this size.

Ref. CW 44/8

## Opportunity in Sales

London, W1 £9,000 on quota

A unique opportunity has arisen for sales people to join a young and rapidly expanding Bureau and Systems House, who can offer ground floor opportunity to the successful candidates.

The Company, situated in W1, has a prime 400 and sells both Application Software and Time. The applications are mainly financially orientated so you will be selling to Accountants and Financial Directors.

The successful candidates will be aged in their mid-20s, and have had 2 years' selling experience, preferably in a Commercial environment, but this is not essential as full time training will be provided. It is envisaged that your career path will give you the opportunity to move into management with the growth of the Company.

Ref. CW 44/3

## Programmer & Analysts

Widely experienced - up to £15,000

Consider the benefits of

- \* Working in West London
- \* Working on communications systems
- \* Progression to project leadership
- \* Variety of job contact
- \* Programme development through VDU's

If you are a Programmer or an Analyst and have had exposure to commercial applications (on any hardware), our client would be very interested to learn more about you and discuss your future. They are a well-established software house and offer a career path based on real time earning above average salaries and large company benefits.

Projects are divided into small teams and there are many opportunities for men and women with management potential to gain experience in project leadership at a very early stage.

Ref. CW 44/6

## System Programming Consultants for Distributive Projects

West London up to £9,300

A major international Software House has a need for the following specialised people.

- \* Programmers with Assembler or ICL 7602 16 Bit Communications Controller interfacing to a 2960.
- \* Programmers with in-depth Singer 1501-1502 experience, which is linked to an IBM 370/148.

They also have a need for experienced Programmers to work large sophisticated 2900 projects using IDMS and TP.

The Company can offer an excellent salary package with the usual fringe benefits one would associate with a Company of this size.

Ref. CW 44/9



## Central Computing Consultants

KINGSTON: 44 Wood Street, Kingston upon Thames, Surrey, England. Telephone 01-549 3212, Telex 27950

DUBLIN: Canberra House, 24 Lower Leeson Street, Dublin 2. Telephone 789577 (5 Lines)

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*Diffusion*



# Operations Staff

...your career  
takes off  
here in Reading  
up to £5804

We're at the forefront of computer technology, we're successful and we're growing fast. This continuing expansion means that part of our Product Development Group based in Reading needs to take on more experienced computer operations staff. It also means that for the right people the career progression we can offer, in Reading and throughout the ICL Group, will be second to none. Check the details below to see where you could fit in.

Team Leaders - up to £5804  
Senior Operators - up to £4450  
(salaries inclusive of shift allowance).

Using ICL 1904S, 2903, 2904 and System Ten you will:

- Provide a communications based George 3 service for development

support and maintenance of 1900 order code software.

- Service commercial workloads for the Software and Literature Distribution Centre.
- Create tailored software libraries and executives for all ranges of ICL machines.

We need to take on people with experience of the following:

- GEORGE 3 - preferably 8.63
- E6RM exec. - ops. exec. on a 1900
- E3RM exec. - ops. exec. on 2903

We operate an attractive shift system (no Saturday nights) and you will be able to enjoy our full range of large company benefits like our generous relocation package if you need to move.

Give your career a lift  
Ring Chantayne Dale on Bracknell  
(0344) 24842 ext. 2653 or write to an  
application form to ICL, quoting reference  
CW4408, Personnel Department,  
Lovelace Road, Bracknell, Berks RG12 4SN.

## International Computers

think computers - think ICL



UNIVERSITY OF KENT  
Systems Programme  
in Computer Science  
Applications invited for  
SYSTEMS PROGRAMMER

posts in the Computer Centre  
University computing centre  
based on a QEC 4080 computer,  
Modular One available today,  
UMICC and Liverpool, with  
7805 processor which links to  
the North West University  
Network. A development team  
within the UMICC (Innovative  
ordinate local and remote  
progress, and the Centre have  
valuable commitments in  
computing facilities for the  
4080 system.

Salary Scale (Other than  
Grade 1A/II) £3853 (1976-77  
annual) (efficiency for 1976-77  
annual)

One post is a senior appointment  
which may be made with  
efficiency bar; the other will work  
the first three points of the scale.

Application forms and letters  
particulars from the Registrar,  
University, Kent, South  
580 Closing date  
November, 1976

CHILTONIAN BISCUITS LTD.

## ANALYST/ PROGRAMMER

c £5000 p.a.

Chiltonian is one of the largest  
independent biscuit manufacturers  
in the country and we  
are based in S.E. London.  
Owing to expansion of business  
we are now in the process  
of setting up a new  
sophisticated on-line accounting  
and sales order processing  
system on a CIL 8050.

Applicants, male or female,  
should have at least 3 years'  
COBOL programming experience,  
be a self-starter and able  
to work on their own initiative.  
He or she will report to the  
Data Processing Manager and  
will work closely with management  
in other disciplines in helping to  
establish these systems.

Please write, giving brief details  
of career, to: Jerry Butler,  
Personnel Manager,  
Chiltonian Limited, Manor Lane,  
Lewes, Sussex BN1 2DT  
Tel: 01-852 9161.

## COMPUTER MANAGER

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control systems

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19, PARK STREET, CROYDON, CR9 1TN

## LATENT VACANCIES i.e. JOBS NOT ADVERTISED IN SURREY, SUSSEX, KENT MIDDLESEX, BERKS, HANTS

FOR ANALYSTS AND PROGRAMMERS

Analysis has shown that jobs advertised by companies are few compared with the total number of vacancies available. Latent vacancies account for the greatest number of jobs available now.

Most companies in these areas register their vacancies with our consultancy as we have an established successful record specialising in the recruitment of computer personnel and executives.

We therefore have extensive knowledge of most latent vacancies in the South and South East - the equipment, languages, salaries and career prospects. We can inform you of vacancies that suit your requirements in the area of your choice.

This free information is just a phone call away. We have done the job search, you phone us now and take advantage of our services

Telephone: Weybridge (0832) 41321 (Consultants).

cb executive (weybridge) TELEPHONE  
0832 41321

## Royal County of BERKSHIRE

### SYSTEMS ANALYST

£5,232-£6,342

To design systems for County and District Council applications. Will have had at least two years' systems experience and responsibility for the design of at least one major system or alternatively a more extensive programming background.

### PROGRAMMING TEAM LEADER

£5,232-£6,342

To lead a group of programmers within a project team and with responsibilities for the process of work and training juniors. Substantial COBOL experience required and experience in the use of an advanced operating system.

### PROGRAMMER

Up to £5,073

COBOL experience required. The above staff are required for an ICL 2970 3 megabyte installation operating under VME/B with a wide range of application systems and a substantial terminal network.

Apply in writing with full details of age, qualifications and experience to: The County Treasurer, PO Box 12, Shire Hall, Reading. Telephone: Reading 55981, Ext. 53. Closing date: November 17.

## AVX LIMITED New Computer Installation in Northern Ireland

A.V.X. is a major manufacturer of ceramic capacitors and is setting up a manufacturing plant in Coleraine, Northern Ireland. Coleraine is a University town and is situated in a pleasant area near the famous Co. Antrim coast.

As part of our continuing build-up we will be installing a communications based IBM 370/138 computer early in 1979 and our planned development includes design and implementation of on-line manufacturing and financial information systems.

As a first step in the development of our Data Processing Department we wish applications from experienced people to fill positions in the following areas:

- ★ SYSTEMS PROGRAMMING
- ★ SYSTEMS ANALYSTS
- ★ PROGRAMMING
- ★ OPERATIONS
- ★ DATA PREPARATION

The successful applicants will receive comprehensive training in IBM hardware and software and will be expected to actively participate in the setting up and future development of the Data Processing Department

The salaries and conditions offered will reflect our intention to make the best possible appointments to these positions. Please write or telephone Coleraine 2464 for application form.

The Industrial Relations Manager  
A.V.X. LIMITED  
Ballycastle Road, Coleraine  
Northern Ireland

## SYSTEMS MANAGER

Streatham From £7,000 p.a.

James Walker (Goldsmith and Silversmith) Ltd., a leading retail jeweller with over 120 branches and a turnover of c.£20M wishes to recruit a Systems Manager to complete a small management team currently drawing up a major long term development plan.

The successful applicant will be backed by a small computer department and will be responsible for a review of computer hardware, development of new systems from user specification to final implementation, and maintenance and support of existing systems. A systems analysis background is required, with at least three years' experience in commercial accounting systems.

This position offers interesting and varied work, a minimum salary of £7,000 p.a. which could be substantially increased for an exceptional candidate, and real prospects of advancement for the person.

Applicants, male or female, should write in complete confidence about previous experience and current salary to: P. Wiggall, Human Resources Management Consultants, 40/43 Chancery Lane, London WC2A 1PL, reference LA60.



### JUNIOR PROGRAMMERS

£3,000 to £4,300

S.E. ENGLAND

You have only 1 year's commercial experience? Then you are in great demand. We have a large selection of first-rate companies who need people like you. Some offer mortgage assistance to the right candidates after short period with them.

CW44/1 Tricia

### MINI COMPUTER PROGRAMMERS

£4,000 to £8,250

LONDON & HOME COUNTIES

If you have experience in ASSEMBLER or micro-code or communications for at least 1½ years then a whole exciting field is open to you. We now have opportunities in S.W., N.W. or W. London, Surrey, Berks. and Hertfordshire for competent people in this rewarding field. The future is definitely going to be with the MINI-computer professional. Telephone for details.

CW44/2 Michael

### DEC PROGRAMMERS

£4,500 to £8,500

LONDON & HOME COUNTIES

We now have commercial user organisations and software consultancy firms looking for DEC programmers with 12 months or more experience. Why not risk the unknown and secure your future? We have the chance to improve both salaries and working conditions. If you are interested please write to:

CW44/3 Michael

### SENIOR CONSULTANTS

£8,500 to £12,000

CENTRAL LONDON

Six large, well established consultancy firms in the region are seeking people with all-round experience in third generation equipment and the right personality to deal with clients who require first class service. Technical Communications Consultants are also required where in-depth implementation experience is essential. ICL, IBM, and other ranges are essential. Excellent fringe benefits and prospects.

CW44/4 Michael

### JUNIOR PROGRAMMER

£4,500

S.E. LONDON

If you have only just started as an RPGII programmer, this company will be interested in you. They only require six months experience on System 3. They offer help with relocation expenses and other company perks. You will help them in developing a new order entry and sales ledger system (we also have three companies in the city looking for more experienced RPGII programmers).

CW44/5 Michael

### JUNIOR SYSTEMS ANALYST

c. £5,000

N.W. LONDON

A major construction company with a small but powerful ICL installation requires a systems analyst with a programming background to work on a variety of commercial and engineering applications. Nice perks.

CW44/6 Michael

### SENIOR SYSTEMS ANALYST

c. £8,000

MR. HERTFORD

This organisation is involved in the design, development and operation of large scale systems. They are looking for a Senior Systems Analyst to join their team. The successful candidate will be responsible for the design and development of new systems and the operation of existing systems. They offer a competitive salary and excellent fringe benefits.

CW44/7 Michael

### PROJECT LEADER

c. £7,000

MR. HERTFORD

If you have 12 months or more experience in the design, development and operation of large scale systems, this company will be interested in you. They offer a competitive salary and excellent fringe benefits. They are looking for a Project Leader to join their team. The successful candidate will be responsible for the design and development of new systems and the operation of existing systems.

CW44/8 Michael

### OPERATORS/SENIOR OPERATORS

Up to £4,200 inc.

MR. MILTON KEYNES

A major engineering firm (offering an excellent relocation package) wishes to recruit several ICL GII or GIII operators. Other top perks include excellent training, 4 weeks holiday and non C.P.S., with prospects of programming eventually.

CW44/9 Tricia

### OPERATOR

£4,700 inc.

W1

A 2 shift IBM DOS/VS GRASP system - just right for you! This progressive international company offers terrific perks such as free lunches, non-CPS plus excellent training facilities.

CW44/10 Tricia

### OPERATORS

£5,000 inc.

FELTHAM

Do you like bureau work? Good, then this ICL GII and GIII installation will attract you. 3 shift system and 21 days holiday, etc.

CW44/11 Patricia

### OPERATORS

c. £5,000 inc.

VICTORIA

If you have 12 months IBM OS experience, this commercial company will be interested in you. They have a 370/145 plus TP 3700's. International 24 hour shift system allows generous time off. Lots of job perks.

CW44/12 Tricia

### FREELANCE PROGRAMMERS

To £200 p.w.

UK & OVERSEAS

IBM Systems Analyst, MBO Berks 3 months  
IBM Systems Analyst, London, Berks. 3 months  
IBM Systems Analyst, Covent 3 months  
IBM Systems Analyst, City 3 months  
IBM Systems Analyst, S.W. London 3 months  
IBM Systems Analyst, Bank in Nigeria 6 months

SEND NOW for the latest vacancies. IBM, HONEYWELL, DEC & ICL programmers welcome. Bonus a 4 week holiday paid break plus an attractive BONUS. Ask for the Contracts Officer on 01-995 3883.

Apply here 1-5

## SOUTH MANCHESTER

### PROJECT MANAGER

SALARY c.£7,000 + Bonus

### PROJECT LEADERS

SALARY c. £5,500 + Bonus + Paid Overtime

Our Clients provide a complete range of systems to one of Britain's most successful industrial/electrical Groups. The diversification within the Group gives you the opportunity of working on a wide range of problems within a number of operating Companies. The Project Manager will take responsibility for the day-to-day running and forward planning of our Client's South Manchester site supervising 4-5 project teams. You should ideally have:

Experience of a manufacturing environment. The ability to accept challenge and lead and motivate staff. Preferably an understanding of on-line and Database techniques gained within an IBM environment.

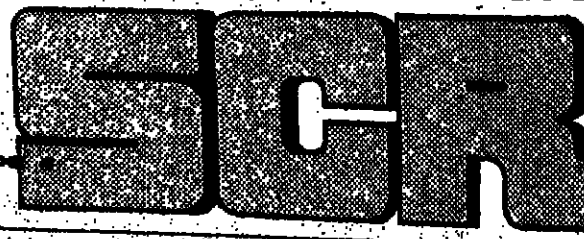
The Project Leader positions require you to control complete projects and in some cases take responsibility for complete Company systems. You should ideally have:

A programming background. 2 years' systems development experience. The ability to lead projects from conception to implementation.

Our clients offer an excellent working environment combined with attractive terms and conditions of employment, including full relocation expenses where applicable.

For further details contact:  
DAVID WADE/SHEILA BRADBURY on 061-833 0427 or 0785 56013  
after 7.30 p.m.

## SPECIALIST COMPUTER RECRUITMENT LIMITED



BIRMINGHAM 021-234 3781  
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Freeport, Blackfriars House, The Parsonage, Manchester M3 8BB  
LONDON 01-935 0671  
Freeport 13, 3 Mandeville Place,  
Wigmore Street, London W1M 0LB

Computing  
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Recruitment Consultants  
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Data Express House, 3 Prospect Place, Heathfield Terrace, Chiswick W.4

01-995 3883 (01958 8438 EVENINGS)



## Analysts and Programmers

Howard Machinery Group can offer you a relaxed professional working environment in rural Suffolk within easy reach of London. The area offers excellent recreational facilities, good schools and first-class housing.

Experienced Analysts and Programmers are required for the Computer Department of our Group Services Company based in Bury St Edmunds and supplying computer facilities to three U.K. companies.

Installation is an IBM 370/138 1 megabyte operating under DOS/VS, CICS, with a DL/I data base.

### Analysts

The successful applicants will join a small team and be expected to make a considerable contribution to our development plans for the network which will include 'on line' production systems for our U.K. locations engaged in the manufacture of agricultural and industrial equipment. Experience in data base and on line systems would be advantageous.

### Programmers

Experienced in PL1 preferably with DOS, CICS and DL/I data base.

For both jobs we can offer an attractive salary and flexible working hours. Training will be given if required and assistance with relocation expenses made available where appropriate.

Write in first instance giving career details to date to:

John Batts  
Personnel Manager  
Howard Group Services  
Saxham  
Bury St. Edmunds, Suffolk  
IP28 6DZ  
Telephone: Bury St. Edmunds (0284) 83100



**data scene**

## CONTRACTS

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All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday.

Ring Ian Carter for further details on 01-261 8016.



### System Design and Programming - Winchester

The computing services for the entire Wessex region are directly managed by the Authority and provide a service for all four Area Health Authorities in the region covering Hampshire, Dorset, Wiltshire and the Isle of Wight. Work is carried out on the following areas: Financial, Administrative, Manpower, Medical Hospital and other distributed systems.

There is a network of district based ICL 2903 computers and 7502 terminal systems linked into the main computer, a 1903T running under George 3.

### Senior Systems Analyst / Programmer

(Scale 9)

Salary £4,959-£6,025

To be responsible to the Senior Systems Designer for detailed system design especially for the more complex parts of a particular application area for planning, writing and costing programmes within a system and for controlling the implementation of some projects.

You should have at least 4 years' experience including involvement in the development of at least one system which has gone into production.

### Programmer

(Scale 4)

Salary £4,421-£5,326

Applicants for this post must have several years' experience in programming including an involvement in the successful implementation of at least one system. Experience of structural design methods COBOL ICL 1900 and 2903 series computers George 3 and NCC standards would be advantageous.

For further details and application forms please contact the Personnel Department, Highcroft, Romsey Road, Winchester. Tel. (0962) 63611, ext. 360.

Closing date 21/11/78

## PL/1 OR COBOL

### Programmers to £6,500

#### WE CAN OFFER YOU:

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#### INTERESTED?

Then if you have sound PL/1 experience or you are a COBOL programmer wishing to learn PL/1.

Ring for an application form on:

01-836 7376

or write to Roger Foord at:

**The Policy Signing & Accounting Centre Limited**  
Temple Station Buildings  
Victoria Embankment, London WC2R 2PJ

## Telecommunications Programmers

IBM United Kingdom Laboratories Limited are looking for experienced programmers, male or female, to be based at their European Laboratories Computer Network located at Hursley, near Winchester.

You will need to have at least two years' Programming experience in one or more of the following: ● System/370 Assembler Language ● PL/1 ● BTAM ● VTAM ● Microcode ● Practical use of data bases.

Responsibilities will include the maintenance and enhancement of the advanced teleprocessing components of the Computer Network at Hursley and the development of programmes to manage the communications network more effectively.

Ideally you will be educated to degree level, although candidates who have achieved an equivalent standard will be considered.

An attractive salary will be paid in line with experience and potential. As well as a substantial employee benefits package, which includes a non-contributory pension scheme and free life insurance, we offer generous assistance with re-location expenses where appropriate along with variable working hours.

Please write to or telephone for an application form: Ron Stotter, Personnel Officer, IBM United Kingdom Laboratories Limited, Hursley Park, Winchester, Hants. Telephone: Winchester (0962) 4433 (Extension 6232). Please quote ref: C.W./936770.



## SALES EXECUTIVE

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**£7,000-£8,000**

This post offers a whole world full of opportunity with our client who has a range of unbeatable products and services to sell. Salary scale of £7-8,000 reflects a true earning situation before the addition of an achievement bonus, pension scheme plus life insurance and a company car. Age range is 25-45. Location is Liverpool.

The successful candidate will be selling systems and program contract services, computer bureau services to government, commerce and industry and industrial training services. Educational qualifications need to be O' level plus

commercial courses, or A' levels and above. Professional experience should embrace data processing, data hardware, programming and systems. Previous formal sales training and a proven track record in selling IT products are essential requirements.

Candidates will be assessed for future management roles, therefore a pleasant but firm personality is just as important as total confidence in their knowledge of the computer industry.

Write or telephone Anna Sweeney for an application form.

**01-582 2600**

### Modern Marketing Limited

Alambic House, Albert Embankment  
London SE1 7UB

## PROGRAMMERS

Have you considered going back to college?  
... As a member of Staff

We require a programmer to join a small team in the Administration Systems section which provides a computer programming service to the University Administration. The section has the use of a dual ICL 1906E configuration, under GEORGE and MAXIMOP, and a separate Philips visible records machine. You should be familiar with ICL 1900 equipment, software and operating systems and have experience of COBOL and at least one low level language.

The work is interesting and varied and you will work in a friendly and pleasant atmosphere. You can look forward to a 35-hour week and a minimum of 24 days leave, including public holidays. As a member of staff you may take advantage of the University facilities, canteen, library, free swimming pool, sports centre, etc.

Salary will be on the scale £3834 to 8054 p.a. incl. (under review). To apply please write to the Personnel Office at the City University, North Square, London EC1V 0HB or telephone Mrs. K. Fowler on 01-261 8016 for an application form and further details.

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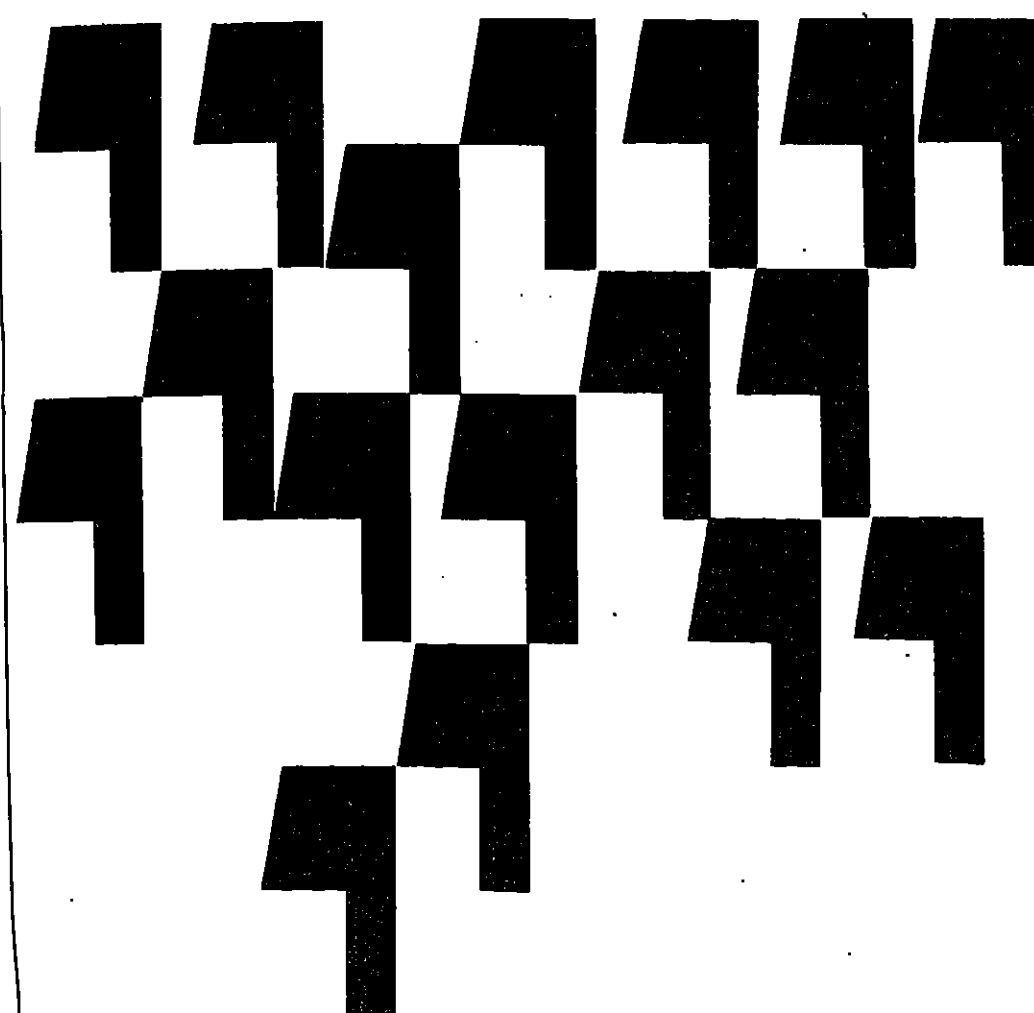
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If you are good, have relevant experience and would like to share in Logica's future, telephone the Personnel Department on 01-637 9111 or write to them for an application form Ref. CA/8. Logica Limited, 64 Newman Street, London W1A 4SE.

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### THE OPEN UNIVERSITY STUDENT COMPUTING SERVICE

### USER LIAISON OFFICER

(Re-advertisement)

Applications are invited for the post of User Liaison Officer at the University's headquarters in Milton Keynes. The Computing Service offers a nationwide timesharing service on DEC-20 and Hewlett Packard 3000 systems based at Computer Centres in London, Newcastle and Milton Keynes.

The successful applicant will be a member of the Operations section of the department and will be responsible for the acceptance and operational testing of inhouse user software and subsequent distribution. The User Officer will work closely with all categories of user including development and academic staff engaged in the production of courses, ensuring that in the design and development of inhouse software proper consideration is given to operational implications.

This is a new position and offers interesting and varied technical work centred around our new DEC System 20 service. It is likely that the successful applicant will have experience in systems programming or Operations User support.

Salary will be on the scale £3,883 - £8,555.

The University offers attractive working conditions including seven weeks' annual leave and help with relocation to the Milton Keynes area. Application forms and further particulars are available, by postcard request please, from The Recruitment Office (JD3628/2), The Open University, P.O. Box 75, Walton Hall, Milton Keynes MK7 9AL, or telephone Milton Keynes 63404, there is a 24-hour answering service on 63888.

Closing date for applications: 21st November, 1978.

### WORCS - GLOS - WILTS - DORSET

### AVON - SOMERSET - DEVON

To £8k +

A wide range of vacancies exists from Programmer to Systems Designer in the above counties (25+ alone in Glos). The equipment in use is also varied. It includes ICL 1900 and 2900 series, IBM 370, DG NOVA, PDP-11, Honeywell and Vairan. The languages vary from COBOL to ASSEMBLER to PLAN to PL-1 to Basic. In short there just isn't enough room to tell you about them all. Should you already live or wish to relocate to this expanding part of the world, then urgently phone Bristol (0272) 426631.

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SPL has five thriving subsidiary Companies covering most of Western Europe. We also have growing interests in North America. Staff to work on projects abroad come from the U.K. company and some 40% of all our people are working on overseas projects.

Our overseas managers are now looking for:-

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- ★ Skilled computer people with practical experience of teleprocessing, distributed processing or message switching.

If you want to work abroad with the attendant financial advantages and think you have the skills for us please phone or write:

Alan Taylor, Resources Manager,  
SPL International,  
12/14 Windmill Street,  
London, W1P 1HF.  
01-634 7633

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Ring Ian Carter for further details on 01-261 8016.

### AnCO - The Industrial Training Authority

Applications are invited from men and women for the following vacancy in the Data Processing Division of AnCO.

## TRAINEE SYSTEMS ANALYST

DUBLIN

The successful candidate will participate in data processing activities with the objective of acquiring a comprehensive knowledge of AnCO's computer-based systems and becoming experienced in the use of systems analysis techniques.

Applicants should have a capacity for accurate detailed work, logical reasoning ability, some relevant background either academically or in terms of work experience. A degree or other evidence of formal training in computer-related subjects would be an advantage.

The salary scale rises to £5,640 per annum. Contributory pension, group voluntary health and sick benefit schemes are in operation. A programme of training and development in relevant computer related subjects will be provided.

Application forms, which should be returned completed, before Friday 10 November 1978, quoting reference 304, may be obtained from

Personnel Officer:  
AnCO - The Industrial Training Authority,  
P.O. Box 466, Baginbun Court,  
27-33 Upper Baginbun Street, Dublin 4.  
Telephone Dublin 01/685777.



## FREELANCERS URGENTLY REQUIRED

Analyst/Programmers with the combination of IBM OS/MVS and ICL 1900 COBOL.  
Rate £250 p.w. incl. David or Lincoln on 01-531 9131  
MANHATTAN

*Handwritten signature*



## ARE YOU LOOKING FOR SALES MANAGEMENT?

One of the Major Computer Manufacturers is looking for 2 experienced medium / large systems sales people, who have reached Senior Sales Executive or Junior Sales Management status, but are now ready for the next step.

You will be given responsibility for very large existing and new accounts, where you can expect to sell £2 MILLION to £20 MILLION systems.

The rewards are high. A guaranteed income of approx. £11,000 in the first year, plus bonus, which will give earnings of £14,000 to £15,000 per annum, but could be much more.

They want people who are mature, clear thinkers, sound business negotiators able to operate at all levels.

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If this interests you, please 'phone or write to the Senior Consultant quoting CW 177.



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Please 'phone or write to the Senior Consultant, quoting ref. no. CW 178.



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## Opportunities in GRAPHICS PERIPHERALS

A rapidly expanding and highly successful electronics Company specialising in computer graphics needs two young professionals, either with expertise in this area or with the desire to gain such expertise.

### SALES EXECUTIVES

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You might already be selling, either in this field or mini-computers, or you could be working in sales support and want to start a career in sales. Either way you should have natural sales ability, willingness to undergo full product training and a strong desire to be successful in an exciting and specialised market place.

### SOFTWARE SUPPORT WEST COUNTRY To £6,000 + Car

You're probably an analyst/programmer providing customer support for a mini-computer manufacturer, and perhaps getting bored working on the same systems. We expect you to be experienced in ASSEMBLER, and some knowledge of FORTRAN would be useful. An ability to get on well with customers is very important. Knowledge of computer graphics is not needed as full training will be given.

FOR FURTHER INFORMATION, PLEASE CONTACT MARK  
IRENS QUOTING REFERENCE: CW/111/1.

HUTTON EXECUTIVE SELECTION LTD.  
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HUTTON STREET, LONDON EC4Y 8HP.

TELEPHONE: 01-353 7141 (24 HOURS)

**Hutton**  
SPECIALIST RECRUITMENT CONSULTANTS

## COBOL PROGRAMMER

Sterling Cable Company Limited, part of an international group, are one of Europe's foremost designers and manufacturers of industrial electrical cables. Our works and offices are located in rural surroundings on the A4, nine miles from Reading and Newbury. We wish to recruit a Cobol Programmer to join a new team developing Batch and On-line systems for commercial and manufacturing applications Configuration ICL 2804-40K, MTS, EDS 30s, FEDS and VIDEOS. Applications are invited from persons of either sex up to the age of 30 years. Experience requirements — one to two years' COBOL programming. On-line experience an advantage. An attractive salary will be offered and benefits include 4 weeks' annual holidays and a pension scheme. Subsidised canteen facilities are available if required.

For an application form, please telephone our Personnel Manager, Mr. J. W. Heading, on Woolhampton 3221, or write to him at Sterling Cable Company Limited, Bath Road, Aldermaston, Reading RG7 5QD.



## UNIVERSITY OF ABERDEEN COMPUTING CENTRE

### SENIOR PROGRAMMING ADVISER

The University has recently installed a large Honeywell dual processor 66/80 System supporting a large terminal network.

Applications are invited for the above post. Candidates should normally possess an honours degree in science or mathematics and have experience of programming in at least two high level languages, having worked in one of the following areas: scientific, mathematical or statistical applications, non-numerical applications, data base management or graphics. Applicants should have at least six years' experience.

Salary on Other Related Staff Grade II Scale, £6,317-£7,754 per annum with appropriate placing.

Further particulars from The Secretary, The University, Aberdeen, with whom applications (2 copies) should be lodged by 17 November 1978.

## COMPANY TRAINING MANAGER

**International Mini Manufacturer  
Central London Based  
Basic Salary Circa £8,000  
Plus Substantial Car Allowance**

Having enjoyed an excellent reputation in the highly competitive visible record and accounting machine market-place, our Clients are now establishing themselves as a leading supplier of small business computers through direct and indirect sales forces.

As part of their controlled expansion and Company development, we have been retained to identify suitable candidates for the key position of COMPANY TRAINING MANAGER.

While the successful candidate will almost certainly be currently employed within the small business computer market-place (either SALES, SALES SUPPORT, TRAINING or MARKETING) the candidate profile is deliberately open. However, it is crucial that applicants identify closely with the following job specification:

- \* The formulation of a total Company training program and responsibility for its implementation.
- \* Ultimate responsibility for the main training areas viz: SALES (PRODUCT & TECHNIQUES), SOFTWARE, ENGINEERING, MANAGEMENT and CUSTOMER; through the distribution of training responsibilities.
- \* The recommendation of the best training methods, and advice and assistance in the preparation of associated training materials.
- \* Liaison with the Training Board and the maintenance of formal and detailed training records.
- \* Naturally, where possible, to be involved in actual training courses, lecturing, etc.

THIS IS A FIRST-CLASS OPPORTUNITY TO FILL A KEY POSITION AND HELP DICTATE THE FURTHER SUCCESS OF OUR CLIENTS' OPERATION IN THE UNITED KINGDOM. PLEASE TELEPHONE THE ADVISING DIRECTOR, BOB BOWER, TO ARRANGE AN INTERVIEW.

CW/111/2

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and Location ..... Mth/Year ..... Mth/Year .....

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Nolton Communications Limited, leading U.K. supplier of short-haul data communications equipment, Modems, Data Network Control Systems, and all the accessories needed for the installation of a complete communications network.

work. We also have a highly successful mobile radio telephone division. The company is based in Cheshunt, Herts, and has recently opened a Northern Office in Manchester.

## We want:

Sales Executives with a proven record in data communications in either sales or technical areas. Most important we are

looking for people with the potential to progress rapidly within the company.

## We offer:

Sales territories throughout the United Kingdom, including two in the Southern Counties. Base salaries (dependent on starting point) range from £4.5K to £6.5K, with commission rates from 2%

to 4% and above in certain circumstances. Benefits including car and expenses, are what one would expect from a progressive British public group.

The company's growth has been rapid, offering opportunities for rapid progressive progression into management.

Call Bob Warden, Sales Director, on Waltham Cross 33555 to discuss the matter further or for an application form

# Nolton Communications Ltd.

Fieldings Road  
Cheshunt, Herts EN8 9TL  
Tel. (0992) 33555/33911  
Telex: 28952

## SYSTEMS ANALYST (£4245-£5073)

## PROGRAMMERS (£3732-£4632)

A Systems Analyst with programming experience and two programmers are required to join project teams developing a variety of systems on the Council's IBM 370/125.

Candidates should have a good academic background. Experience of Cobol and DOS/VS would be a considerable advantage.

Benefits include flexible working hours, 4 weeks' holiday, a staff club and subsidised canteen. In appropriate cases relocation expenses and lodging and separation allowances may be payable.

Application forms and further details are obtainable from the City Treasurer, Civic Centre, Southampton. Tel. Southampton (0703) 23865, Ext. 468.

Closing date November 15th, 1978.

**Southampton City**



## 2900 Development in Devon

The Authority has recently completed the transfer of systems from an ICL 19021 to a 2Mb 2860 running under VME/B and now offers 1P, MAC and batch facilities, together with a BMEEP emulation environment, providing a production service for financial and technical applications and a development service for both COBOL and FORTRAN programmers.

Due to internal promotion, we now require a further

### Cobol Programmer

Salary £3867-£4161 plus £312 p.a. salary supplement at age 18.

with a minimum of 2 years' experience, preferably on ICL equipment in the 1900 and/or 2900 series, although suitable training will be provided where appropriate.

This is an excellent career opportunity for an enthusiastic applicant wishing to work in a stimulating environment in the South-West. The post is based in Exeter.

Application forms can be obtained from the Personnel Officer, 3-5 Barnfield Road, Exeter, EX1 1RE (Tel. 50861) and should be returned not later than 16 November 1978.

ROBERT GORDON'S  
INSTITUTE OF  
TECHNOLOGY, ABERDEEN  
COMPUTER  
SERVICES UNIT

## ASSISTANT PROGRAMMER

A vacancy exists in the Computer Services Unit for the above post, to assist in developing application programs in support of the Institute's teaching commitment. These applications are primarily written in COBOL and run on the Institute's DECsystem-20 computer. Salary scale £2556-£3270 per annum. Local Government Superannuation Scheme. Application forms and further particulars are available from the Chief Administrative Officer, Robert Gordon's Institute of Technology, Schoolhill, ABERDEEN AB9 1PR.

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## SCOTTISH HEALTH SERVICE

Appointments to the Computer Department of Grampian Health Board

The Grampian Health Board, which is responsible for provision of Health Care Services for a population of 460,000 in the North East of Scotland has the following vacancies in its Computer Department based in Aberdeen:

## SENIOR SYSTEMS DESIGNER Salary £5637-£6715

Candidates should have considerable experience in computer systems and would be expected, initially, to assume responsibility for the development of major and budgetary services to the Board.

## SENIOR PROGRAMMER/ANALYST Salary £4958-£6025

Candidates should have significant experience in computer systems, or database techniques. The post would initially involve the further development of medical information systems.

Application forms and further details of these posts are available from the:  
Area Personnel Officer  
Grampian Health Board  
1 Albany Place  
ABERDEEN AB9 1RE  
Telephone 0224 28901, extension 244  
Closing date November 20th, 1978.

Advertisers are reminded that the new Computer Weekly area feature will be published on November 23 and will highlight career opportunities in Wales and the West Country. Space reservations should be made as soon as possible to:

Basil MacGowan  
Birmingham—021-366 4838  
Eddie Farrell  
London—01-261 8097

Copy Deadline: PM Friday before

**COMPUTER WEEKLY**  
THE INDUSTRY'S WIDEST READ AND MOST REPUTABLE PUBLICATION

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High Growth Market

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Manchester Based

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Our client is a rapidly growing DP Division of an established international organisation, designing, manufacturing and marketing its own products. The Company's distributed processing products represent a comprehensive range with the emphasis on intelligent terminals and network processors. The systems offer high quality and value to a wide range of financial, industrial and government users in this rapid growth sector. They would like to hear from men or women with proven sales experience in the main frame, bureau or small systems markets, who now wish to

enter the rapidly expanding distributed intelligence and terminal markets. The Company's growth rate is such that it is also interested in discussing sales careers with other experienced DP people.

Ref: S3740/CW

Replies will be forwarded direct, unopened and in confidence to the client unless addressed to the Security Manager listing companies to whom they should not be sent. They should include comprehensive career details, not refer to previous correspondence with PA and quote the reference number on the envelope.

## PA Advertising

Hyde Park House, 60a Knightsbridge, London SW1X 7LE. Tel: 01-235 6060 Telex: 27874



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## TOP SALES EXECUTIVES

COMPUTER SYSTEMS

BRISTOL

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The positions require a special ability to sell computer equipment in the range £10k-£40k to financial and production directors and an ability to negotiate at the highest levels of management.

Remuneration will include company car, contributory pension scheme, life insurance, basic salary, commission and profit sharing, and will be well into five figures for on target results.

Replies to Director of Sales, Wilkes Computing Limited, Bush House, 72 Prince Street, Bristol.

## D.P. MANAGER

IBM SYSTEM 34  
SALARY £8K + CAR

D.P. Manager required responsible for implementing completely new system for company involved in shipping industry and located in the city. The manager will be expected initially to develop the system suitability which will involve travel to the Far East & U.S.A. and undertake staffing of installation. Benefits include after 26 week probationary period; company car, private medical plan, private pension plan, accident insurance, sickness insurance, holidays 3 weeks increasing to 5 weeks.

Please write enclosing a C.V. and Tel. No. To Mr M. R. K. Wilson  
Green Jack Shipping Agency (UK) Ltd.  
7th Floor, Plantation House  
31/35 Fenchurch Street, London E.C.3

Interviews will be held in London on 11th/12th December.

## THE SALES BIT

# Picking right time to present that glossy brochure

IN a job like mine where one is supplying a range of services within a sales and marketing environment across the whole spectrum of the computer industry, comparisons are inevitable. A particular area in which one is exposed to extremes of taste and judgement is sales literature. Within the scope of a small number of computer companies one can witness a myriad of possibilities from the gaudy, banal and pointless to the tasteful, succinct and objective.

I often wonder how some material ever got as far as the printing press, such is the appalling presentation and failure to fulfil the basic function of an effective sales aid. One can only assume that in such cases the total process of generation and evaluation is embraced in the single act of: "It's about time we had some decent sales literature, see what our advertising people can come up with" — or words to that effect.

Certainly, I have known many situations where there has been no real involvement by sales and marketing personnel between the initial demand for sales literature and the receipt of the completed article by salesmen in the field. The creation of sales literature, like so many aspects of sales management, cannot be effective if it is carried out in a vacuum. There are so many benefits to be gained from harnessing the objective and creative capabilities of sales and marketing people, both in the field and in the office, that it is essential to solicit their ideas and opinions; whilst at the same time ensuring that the "horse", that is being designed does not become a "camel" as a result.

There are two primary considerations to be made in the context of sales literature: ● How should it look? ● How should it be used? The answer to the latter question is less complex than the first, so I will start with that one.

The main function of sales literature is to confirm a sales story which has already been told. It can also be used to emphasise a particular point within the sales story; but care should be taken not to hand over the material to the client until the sales presentation is completed.

This is no better a method of pre-empting the major features of the sales story, no surer way of losing the client's attention, no more reliable a device for becoming "side-tracked" than allowing the potential buyer to get his hot little hands on a nice shiny sales brochure. After all, the material has (hopefully) been designed to be eye-catching and able to hold the reader's attention so what is his incentive for listening to the sales-

man's "biased" argument when he can see the product for himself and make his own decisions? So salesmen, beware!

Sometimes sales literature can be used to create a sympathetic environment within which the salesman can justify an initial sales call; but this is a very risky practice. More often than not, mailing sales literature has the opposite effect to the one intended. That is, it becomes a justification for the client refusing to see the salesman.

"I've read your brochure and consequently have a good appreciation of your products. If we ever want any 'let you know' or 'it is clear that your products and prices are very similar to those we are already receiving from another supplier and with whom we are completely satisfied."

This action once again pre-empted the sales argument and the application of benefits to the potential buyer's unique situation. The salesman is immediately in a defensive situation, justifying the very call itself rather than the direct benefits of the product to the client.

This situation is not only unsatisfactory but also doubly difficult because dialogue becomes locked into written and telegraphic communication rather than face to face.

The ideal sales literature to precede the first sales call

to a piece of paper than a salesman — usually!

More next week.

TRADER

PRODUCT NOTES

## Graphics VDU

INTERACTIVE process monitoring and control is the main application area for the 3877 graphics display unit now available from Siemens.

The 3877 comprises a minicomputer controller and up to four monitors can be used to select and examine any part of a particular graphics frame in detail using a joystick that can move a "window" continuously over the frame.

The operator can also add to the contents of the screen interactively using a keyboard and light pen. Software provided by Siemens with the 3877 enables graphics symbols and images to be created and stored in an image database.

Siemens AG, (CW), Postfach 3240, D-8520 Erlangen 2, West Germany. Tel: (0131) 73394.

Puzzle Answer

IN the simpler ordinary derangement problem;  $h \rightarrow a(h)$ , there are  $D(n)$  secondary derangements  $a(h) \rightarrow b(h)$ .

Now  $b(n) \neq n$  and  $b(n) \neq a(n)$ , so that  $b(n)$  can only be changed with one of  $(n-2)$  possible symbols, say  $b(h)$ . If  $b(h) \neq h$ , this is a  $D(n-1)$  derangement, but if  $b(h) = h$  it is a  $D(n-2)$  derangement.

Also  $D(1) = 0$ ,  $D(2) = 1$ ,  $D(3) = 0$ ,  $D(4) = 3$ ,  $D(5) = 8$ ,  $D(6) = 26$ ,  $D(7) = 132$ ,  $D(8) = 840$ ,  $D(9) = 5441$ ,  $D(10) = 40320$ ,  $D(11) = 362880$ ,  $D(12) = 3628800$ ,  $D(13) = 39916800$ ,  $D(14) = 479001600$ ,  $D(15) = 6229615200$ ,  $D(16) = 87178291200$ ,  $D(17) = 1320000000000$ ,  $D(18) = 22381411840000$ ,  $D(19) = 447628236800000$ ,  $D(20) = 9864102400000000$ .

Thus the number of double derangements of order  $n$ , given by  $D(n) \times D(n)$ , is actually  $D(n) \times D(n-1)$ . But for  $n = 5$ ,  $D(5) = 8$  and for  $n = 4$ ,  $D(4) = 3$ . So for  $n = 5$ , the total number of double derangements is  $4 \times 3 = 12$ .

For each of the



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## Ascii through the Logic Gate

An epic in 32K words, by Richard Forsyth

### Block 20 (Blockhead)

Having dispatched Ascii on a do-or-die mission to Fort Ranfour with Dr Null's contagious gigotic induction program embedded in his microcode, Hex rejoins his fellow outlaws at Sprocket's Hole. In the small hours his repose is shattered by a signal on his personal radio. Simula is trying to make contact.

"HEX? Are you receiving me?" came Simula's inquiring voice again, crystal-clear through the ether.

"Receiving you loud and clear. Over."

There was a crackle of static, then her reply: "I can't hear you too well. Can you increase the power of your transmitter?"

Hex hesitated. His transmitter was for local use as a walkie-talkie in and around Base 16. So was hers, but evidently she had got hold of an amplifier. If there was one thing the System would like, it was a nice strong radio beam to take a fix on.

He looked around at his companions asleep on the wooden floor. To give away his own position was bad enough, but if he were caught they would fall with him.

"Hex?"

If it had been Fetch or Execute, he might have suspected a trick and shut up. But Simula? Surely she was incapable of treachery. His reply went out at normal strength: "What is it?"

"Listen," she responded instantly, "I still can't hear you very well, but this is an emergency. I'm being held captive at Fort Ranfour. They want to use me to lure you in. I must warn you: don't come even if I ask you. Do you understand?"

"What do you mean?"

"Don't on any account listen to any further broadcasts I make. They may torture me and I may agree to ask you to meet me somewhere; but IGNORE IT! OK?"

"Torture you?" Hex's mind was reeling.

"It's no good," she said, "I still can't hear you clearly. Just remember what I've said. Don't listen to me after tonight, no matter what. Bye, Hex. Good luck."

Hex boosted his transmitter to full power. "Simula! Wait!"

"No. It's not safe to go on. Someone might eavesdrop. Over and out."

"Simula, I have to tell you something too. Don't go yet."



But all his calls were unavailing. She had closed down for the night.

He switched off his FM set. This bolt from the blue had stirred up a gaggle of unresolved questions; but none more insistent than this: Why did he have the receiver on in the first place? Why, since leaving Base 16, had he kept that channel permanently open? There was really only one answer.

He rose to his feet, careful not to disturb the other sleepers. He could see only one way ahead. Simula had warned him not to contact her; but he hadn't had time to tell her that Ascii was on his way, primed to destroy Fort Ranfour. As soon as Ascii arrived the whole System would go gylotic, and in that conflagration Simula would undoubtedly perish. He owed it to her: he must go to Fort Ranfour and bring her out alive.

He tiptoed outside. It was another sharp cool desert night. The stars were precise pinpoints. He felt wide awake and raring to go. He walked away from his comrades with no real thought for the consequences of his action.

His mind turned to Cleo. At 16, he decided, she was just too young. He was 55 and though in terms of the android life expectancy of 255 years and he was still a stripling (hence his nickname, the Hexadecimal Kid) it made him too old for her. She had plenty of spirit, all right: she was a plucky girl. The trouble with Cleo was that she was too possessive. She was very stubborn about not getting cybernated too. She had a pathological phobia of all things electronic. All she wanted was to settle down on some reservation — free from interference by the Information Society — and raise a family. It was not a prospect he could share with any enthusiasm.

The first hint of dawn tinged the sky. He quickened his rather leisurely pace. Fort Ranfour was near San Jose. The quickest way was to head north through Silicon Valley. That meant crossing the ruins of the human reservation again.

When it grew light he left the road and made his way across rough country. In the early afternoon he came to the desolate reservation. He was amazed to find that the humans were back — a few of them anyway. In the centre of the ghost town some tents had been erected, and the smoke from a cooking fire was curling lazily into the air. You had to give these humans full marks for tenacity: like rats, it was hard to keep them down for long.

He gave them a wide berth. A lone android could expect no mercy after their treatment at the hands of the Night Operators. He didn't want them venting their spleen on him. So his path led, skirting the city, to the wooded hillock where he had buried his father, Abraham Synapse. It seemed more than one lifetime ago.

Feeling in a contemplative mood, he scratched about, turning over the fallen leaves with a stick; but he could find no sign of the grave. Professor Synapse (or Dr Null, as he still thought of him) had returned to the earth.

He sat down and reviewed events since he had last been there. The System circulated horrific tales of data-starvation, but they were largely bogus. Now that he had written a neat little forgetting algorithm he had had no more trouble with directory overflows, and his average access time was greatly reduced. Of course he had to lose certain trivial details, but he had come to prefer it that way.

Forgetting, he concluded, was very important. The uncritical hoarding of information was a great handicap. If the Database could only renounce its miserly attitude towards data, half its problems would disappear overnight. After all, everyone knew that data expands to fill the storage allotted to it.

Has he forgotten something? More memorable incidents next week.

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